OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME 44, NO. 6
MARCH 14, 1955

AMERICAN

DYESTUFF REPORTER

Devoted to Textile Chemistry
BLEACHING • DYEING • PRINTING • FINISHING

New... from Du Pont: "SEVRON"* dyes that give stay-bright colors to "ORLON"† and "ORLON"-WOOL blends

Bright colors for "ORLON" and "ORLON"-wool blends keep their beauty with Du Pont "SEVRON" dyes. Developed *specifically* for "ORLON", these dyes give good light fastness and excellent wash fastness. Level dyeings in a wide range of colors mean bright shades may be duplicated easily from run to run.

A major advance in dyeing "ORLON" and other acrylic fibers, "SEVRON" dyes have a direct affinity for "ORLON" Type 42 fiber. You can apply them directly to stock, top, yarn and piece goods without using the copper method. They give excellent build-up in heavy shades, too. So specify "SEVRON" dyes by Du Pont the next time you dye "ORLON":

"SEVRON" Yellow L	"SEVRON" Blue B
"SEVRON" Yellow R	"SEVRON" Blue 2G
"SEVRON" Brilliant Red 4G	"SEVRON" Green B
"SEVRON" Red L	"SEVRON" Orange L

For technical aid in your dyeing problems write to E. I. du Pont de Nemours & Co. (Inc.), Dyes and Chemicals Division, Wilmington 98, Delaware.

*Trade-mark
†"ORLON" is Du Pont's trade-mark for its acrylic fiber.

Du Pont Dyes

DU PONT

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

PERMA FIX-45

cuts color bleeding AND INCREASES FASTNESS TO HIGH TEMPERATURE WASHINGS

PERMA-FIX 45 developed by research has **proved by performance** its effectiveness in reducing color bleeding to a minimum, it increases fastness to high temperature washings. It represents a new high in achievement of fast colors on synthetics.

Perma-Fix 45 also reduces crocking —

- **increases fastness to washing and perspiration**
- **improves color fastness to wet-pressing and wet-processing**
- **effects little or no change in dyed yarns or fabrics**
- **used in combination with resins and finishes**

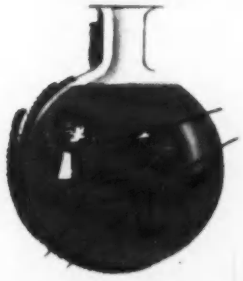
Dyers will like Perma Fix-45 for its **easy application — quality results — lower costs**

- **Technical Bulletin and Service available without obligation**

Refined PRODUCTS

*Trade Mark Reg. Pending
†du Pont Polyester fiber

AMACRON RED VIOLET LS



AMACRON ORANGE LS

Glorify your Dacrons with AMACRON* DYES

An all-new range of SUNFAST colors created specifically for DACRON†

AMACRON BLUE RLS

AMACRON RED BLS

AMACRON YELLOW LS

Here at last is a new range of dyes expressly created for Dacron. After years of intensive research, A.A.P. has successfully perfected a group of new colors offering the fastness properties found most essential in the dyeing and printing of Dacron fabric and yarn.

Dyers, finishers, and printers all are finding that the AMACRONS assure amazing sunfastness, together with excellent resistance to washing and sublimation. AMACRON Dyes may be applied to Dacron either in pressure equipment or in open equipment by conventional methods using carriers as needed. All of the AMACRON dyestuffs are distinctively pleasing as self-shades and mutually compatible in mixtures for the production of mode shades of tan, green, brown, grey or black.

For a free copy of our informative brochure, **Dyeing of Dacron,** and data tailored to your individual requirements, consult our nearest branch. A.A.P. technicians will be happy to arrange a trial run at your convenience.

AAP

AMERICAN ANILINE PRODUCTS, INC.

50 Union Square, New York 3, N. Y.
Plant: Lock Haven, Pa.

Branches: Boston, Mass.
Providence, R. I. • Philadelphia, Pa.
Paterson, N. J. • Chicago, Ill.
Charlotte, N. C. • Chattanooga, Tenn.
Columbus, Ga. • Los Angeles, Cal.

Dominion Anilines & Chemicals, Ltd.
Toronto, Canada • Montreal, Canada

Now! The greatest step forward in textile finishing since the discovery of detergents!

NEW FABRIC SOFTENER!

Only 0.2% in bath fluffs up nap like magic—gives all fabrics an amazingly soft hand!

Natural fabrics! Synthetics! Blends! You'll want to rinse every fabric you produce in Arquad 2HT—Armour's amazing new fabric softener. It's a chemical with positively charged molecules that stick to the fabric itself—softening every single fiber! No soap, detergent or water softener can do what it does! And it's so easy to use—just add it to the final bath.

Only 0.2% of Arquad 2HT gives all fabrics antistatic properties and extra smoothness with no oiliness or discoloration. Fabrics rinsed with Arquad 2HT also resist dirt, dry faster, are easier to handle.

Send the coupon for a free sample and try Arquad 2HT yourself. When you see what it can do, you'll know it's a must for your mill! Cash in on softer fabrics now—send today for Arquad 2HT!

Makes stiff fabrics **SOFT!**

Makes rough fabrics **SMOOTH!**

Makes all fabrics **SELL!**

Armour Chemical Division
1355 W. 31st Street • Chicago 9, Illinois

☐ Send me a FREE SAMPLE of the new fabric softener—Arquad 2HT

☐ Send me Technical Bulletin E-1 on Arquad 2HT

Name _____ Title _____

Firm _____

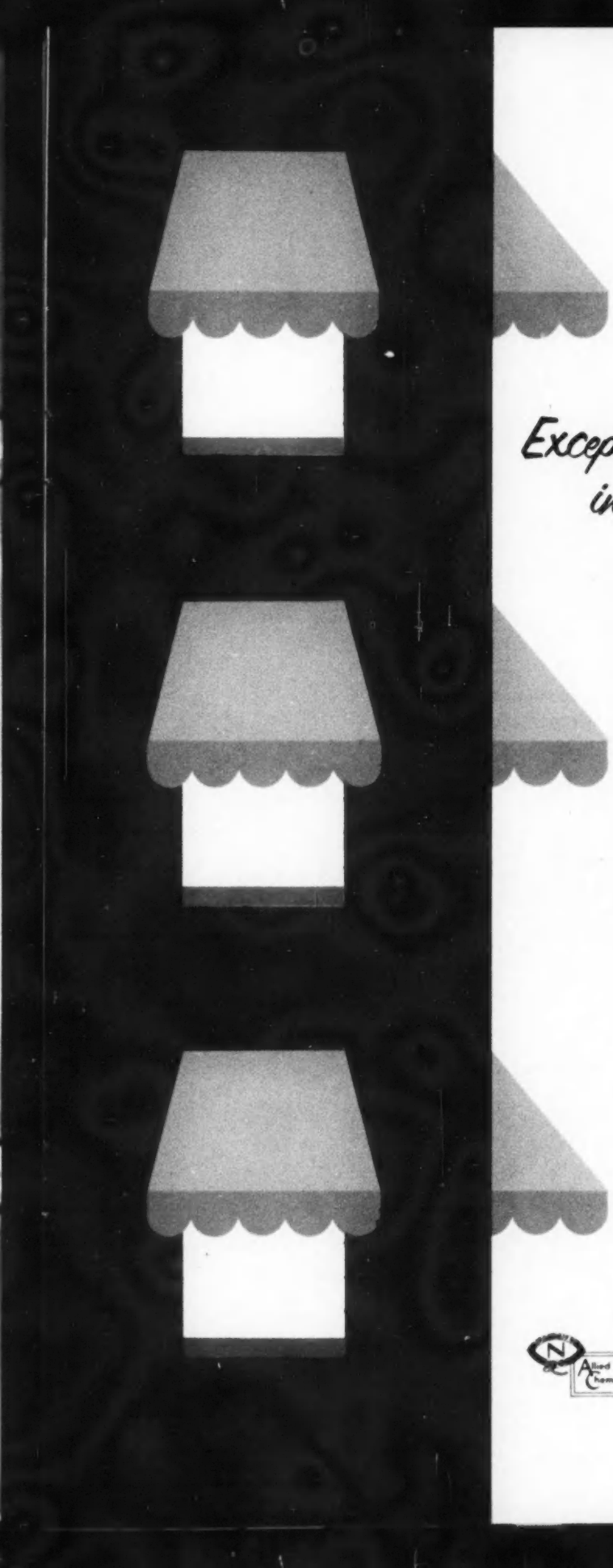
Address _____

City _____ Zone _____ State _____

AD-3

ARMOUR CHEMICAL DIVISION
© Armour and Company • 1355 West 31st Street
Chicago 9, Illinois

American Dyestuff Reporter, Vol. 44, No. 6, March 14, 1955. Published every other Monday. Copyright 1955, by Howes Publishing Co., Inc., 44 E. 23rd St., New York 10, N. Y. Domestic subscription, $7.50; Canadian, $8.50; Foreign, $15.00. Effective Dec. 1, 1954 Entered as second-class matter Nov. 6, 1919, at the New York, N. Y., Post Office under the act of March 3, 1879.



Exceptional all-around fastness in a vat yellow

NATIONAL CARBANTHRENE YELLOW 3R PASTE

Those 8 words summarize the story of this unusual National anthraquinone vat dye. On cotton or rayon, it produces very reddish shades of yellow with excellent fastness to light, washing, boiling soap, stoving, chlorine and peroxide bleaching, mercerizing and cross dyeing. So it gives excellent results on fabrics that will be subjected to sun and weather, severe laundering and hard usage.

NATIONAL CARBANTHRENE YELLOW 3R PASTE can be dyed by all the usual dyeing procedures in all types of dyeing equipment. It is unaffected by the presence of metals in the dye bath, little affected by resin finishes or rubberizing.

Our nearest office will be glad to supply samples, technical bulletin, shade card and prices.

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Philadelphia Chicago San Francisco
Portland, Ore. Greensboro Charlotte Richmond Atlanta
Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto

Allied Chemical

Columbia-Southern is the dependable new producer of chrome chemicals. Shipments are being made promptly from its plant in Jersey City, New Jersey.

Columbia-Southern, the leading merchant producer of chlorine, and a leader in the manufacture of alkalies, brings to the chrome field a rich background of knowledge in quality chemical production and an enviable record in customer service.

Columbia-Southern, a wholly owned subsidiary of Pittsburgh Plate Glass Company, provides your guarantee of stability, assured source of supply, and progressive policies that are conducive to pleasant business relationships.

Columbia-Southern welcomes your inquiries and the opportunity to serve you.

now!

COLUMBIA-SOUTHERN CHROME CHEMICALS

BICHROMATE OF SODA

BICHROMATE OF POTASH (powdered)

BICHROMATE OF POTASH (granular)

CHROMATE OF SODA

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago
Cleveland • Boston • New York • St. Louis
Minneapolis • New Orleans • Dallas • Houston
Pittsburgh • Philadelphia • San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

A SHORT GUIDE TO BETTER FINISHING

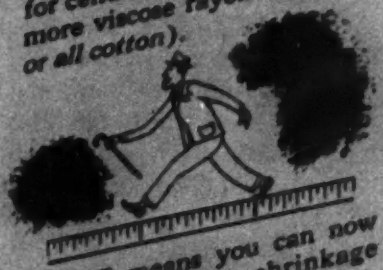
by

ONYX

OIL & CHEMICAL COMPANY

LIFE-OF-THE-FABRIC SHRINK-PROOFING FOR RAYON AND COTTON

You can be sure . . . your shrinkage is set with CET, the amazing new stabilizing agent for cellulosic fabrics (50% or more viscose rayon or cotton, or *all* cotton).



CET means you can now achieve absolute shrinkage control and wrinkle resistance on such fabrics through an indefinite number of commercial launderings, with no or negligible loss of tensile strength.

Easy formulation and application of water-soluble CET are only two of its many advantages. CET also will not resinify, or embrittle and stiffen like ordinary resin treatments. It is compatible with hand-modifying finishes; it can be applied on conventional equipment.

Nothing speaks better for CET than a mill demonstration. Ask for yours today and remove all doubts on shrink-proofing your cellulosic fabrics. The Onyx Technical Service Representative will be glad to assist you, without obligation.

LIFE-OF-THE-FABRIC WATER REPELLENCY FOR ANY FABRIC

A high quality silicone-based water repellent that offers the maximum in durability, potency and versatility, REPELOTEX is the answer to low-cost, high-production, life-of-the-fabric repellency.

A most effective agent through repeated normal laundering and dry cleaning, REPELOTEX resists non-oily spots and stains, permits dry cleaning of oily spots. REPELOTEX can be used at considerably lower concentrations because of its higher potency, and has a number of unusual advantages for the finisher: it improves hand and sewability; strengthens resin-treated fabrics; resists mark-off; lacks unpleasant odor; requires no after-wash; is easily applied; is completely compatible with resin finishes when used as recommended.

Reap every benefit in terms of production, economy and quality at no or little increase in cost over ordinary non-silicone finishes with REPELOTEX. An Onyx Technical

Service Representative will be glad to arrange for a mill demonstration for you without obligation—the best proof of all that REPELOTEX is best of all.

LIFE-OF-THE-FABRIC SOFTNESS OF HAND FOR RESIN FINISHES

For over a decade and a half, the ONYXSANS have established and consistently maintained an industry-wide standard of comparison for unmatched *soft* effects on all types of fabrics.

The easiest of all finishes to apply, involving no changes in equipment or operations, the ONYXSANS provide a range of hands that is permanent to laundering and dry cleaning on all types of synthetic and cellulosic fabrics.

The ONYXSANS are especially useful in reducing surface harshness and boardiness of fabrics resin-treated for crush resistance and dimensional stability. They impart a quality softness and are exceptionally well adapted to whites and light shades because of their minimum yellowing effects. The excellent lubricity imparted by the ONYXSANS improves the physical properties of resin-finished fabrics.

With the millions upon millions of yards processed with ONYXSANS, there has been

no single complaint as to their quality or effectiveness. Despite the modest cost of the ONYXSANS, quality has been maintained consistently through rigid raw materials specifications and production controls.

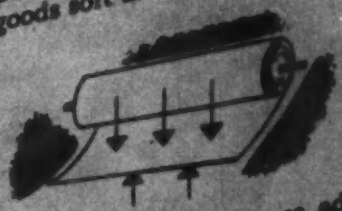
Ask the Onyx Technical Service Representative to tell you more, show you more and arrange for a mill demonstration on the ONYXSANS.

ADD MORE LIFE TO YOUR DYEING WITH A TOP AUXILIARY

An unusually effective all-around textile auxiliary, Onyx ALIPHATIC ESTER SULPHATE is an anionic dyeing assistant of great value for most fabrics.

Eliminating "shiners" and "crows-feet" in the dyeing of acetates and acetate blends, ALIPHATIC ESTER SULPHATE is also exceptionally useful in vat dyeing cotton and rayon and acid dyeing wool.

In every case, it produces unusual dye levelness, gives excellent penetration into seams and compact portions of fabrics, is highly efficient in dilute solutions, is compatible with acids, alkalies, electrolytes and hard water, has excellent stability, retards speed of exhaustion (preventing uneven dyeing), prevents bronzing, can be used at boiling temperatures and leaves dyed goods soft and pliable.



There are many more advantages to your using ALIPHATIC ESTER SULPHATE, and an Onyx Technical Service Representative will be glad to explain them. Call upon him today without obligation.

ONYX

OIL & CHEMICAL COMPANY

WARREN & MORRIS STS., JERSEY CITY 2, N. J.
CHICAGO · BOSTON · CHARLOTTE · ATLANTA

TEXTILE DIVISION

West Coast Representative:
J. T. Browning Co., San Francisco, Los Angeles
For Export: ONYX International, Jersey City 2, N. J.

WE'RE MOVING!

ATLAS-OMETERS

FADE-OMETERS . . .
WEATHER-OMETERS . . .
LAUNDER-OMETERS . . .

are moving February 15, 1955,
to the new Atlas Plant at
4114 North Ravenswood Avenue,
Chicago 13, Illinois

This entire building will be occupied by Atlas Electric Devices Co. for the manufacturing, testing, and research work of Fade-Ometers, Weather-Ometers, Launder-Ometers, Atlas Scorch Testers, and the Atlas Accelerator. After February 15, 1955, address all communications to the new address.

ATLAS ELECTRIC DEVICES CO.

4114 N. Ravenswood Ave., Chicago 13, Illinois, U.S.A.
Telephone EAstgate 7-4520

Sales Representatives:

Charlotte	New York	Philadelphia
San Francisco	Seattle	Pawtucket
Los Angeles	Portland	

and other principal cities throughout the world.

DUROFAST DUROFAST DUROFAST

KEEP IT HOT

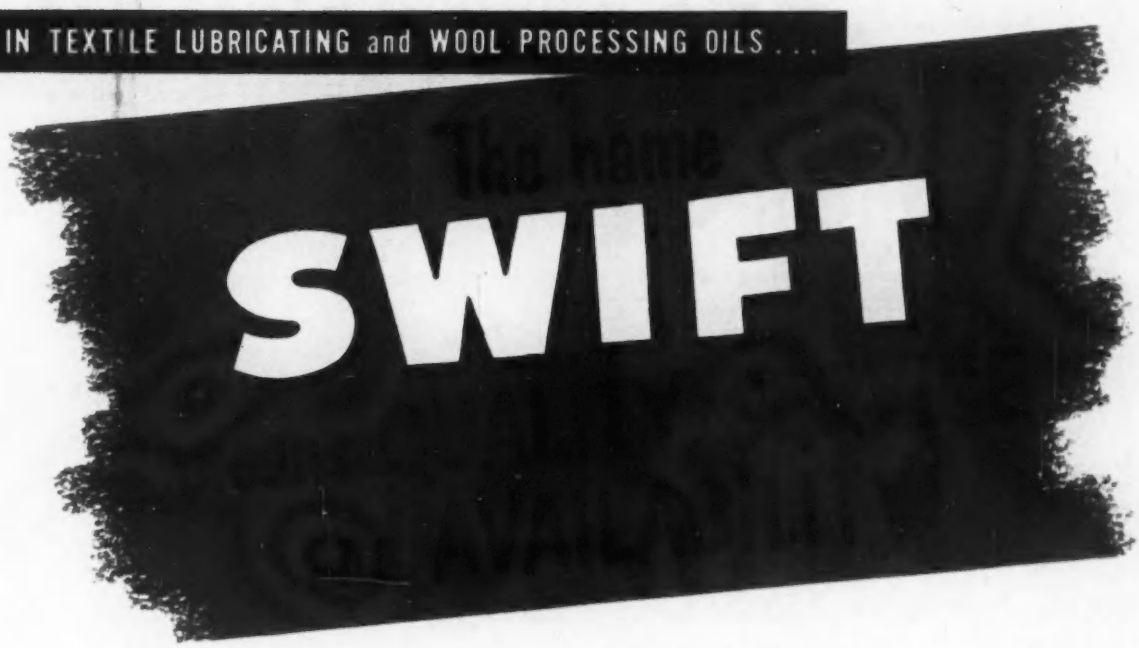
you save money at higher temperature with

RAPIDASE®

Continuous high temperature de-sizing has been adopted by virtually every large dyer and finisher in the country. The majority of these use RAPIDASE. One reason is that of all enzyme de-sizing preparations, RAPIDASE is most heat resistant and consequently most suitable for the speedier and more economical de-sizing at higher temperature.

WALLERSTEIN COMPANY, INC., 180 MADISON AVENUE, NEW YORK 16, N. Y.

IN TEXTILE LUBRICATING and WOOL PROCESSING OILS . . .



WOOL OILS . . . Swift's No. 70-s and 1350-s special self-emulsifying oils, do a real job on fiber lubrication. They hold water long and well—yet wash out easily, quickly, and offer real protection against breakage during carding, combing, drawing and spinning.

LAREX . . . Swift's brand name for specialized lard oils, Larex is available in many grades for shearing, lubricating and soap making. Extra special Larex is especially blended to the specifications of the manufacturers of top quality woolen yarn.

RED OILS (Oleic Acid) . . . For use in soap or textile chemicals, Swift offers an extensive and versatile line of quality Red Oils . . . manufactured by a new process designed to provide maximum selectivity as to color and titer.

QUALITY PRODUCT—Swift's wool processing and textile lubricating oils are processed under the strictest laboratory and production control. Extensive facilities and experienced personnel enable Swift to produce a variety of versatile quality products and product combinations to meet specialized needs.

SERVICE—In every phase of Swift's operation, service is the byword—prompt, courteous attention to your needs . . . assistance in solving your problems . . . prompt, efficient, dependable delivery . . . *interested* follow through after delivery.

COMPLETE FACILITIES—Three versatile processing plants at Hammond, Ind., Chicago, Ill., and Harrison, N. J., are equipped for high quality processing in volume. Nationwide warehousing puts many items close at hand. Swift's extensive research laboratories are constantly at work developing better textile and wool oil products—to better serve your needs.

Check the list of Swift's industrial and wool processing oils at the left for your requirements and use the coupon below to obtain further information on the products you are interested in.

ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

Swift
1855 CENTENNIAL 1955
TO SERVE INDUSTRY BETTER

USE THIS COUPON FOR FURTHER INFORMATION

SWIFT & COMPANY, Industrial Oils Dept. O-17
1822 165th St.
Hammond, Indiana

Please send further information on Swift's wool and textile processing oils: Wool Oils ☐ Larex ☐ Red Oils ☐

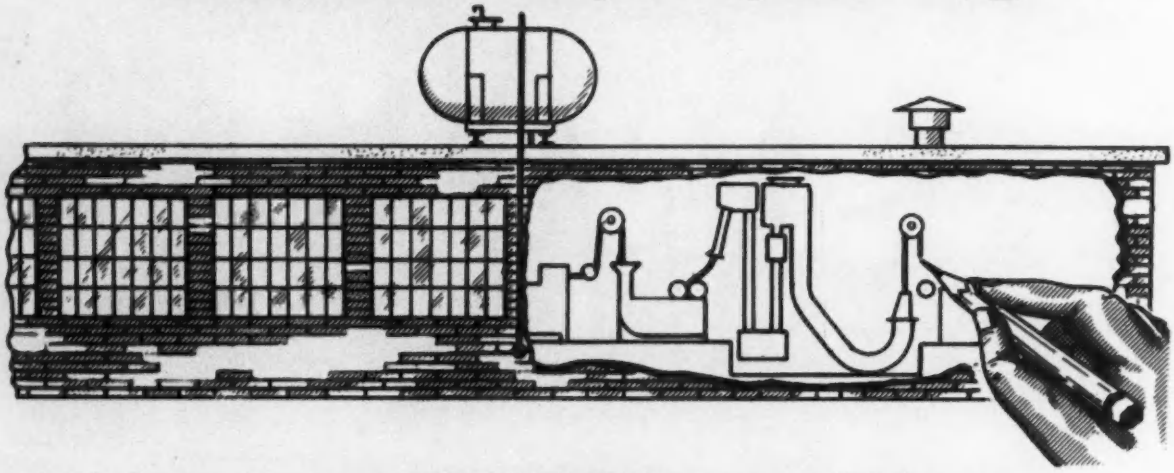
Company_____

Address_____

City_____ Zone____ State_____

Your Name_____

Faster, more efficient bleaching starts with expert planning...



and here's how DU PONT can help you with its SPECIAL MODERNIZATION SERVICE

When you plan an expansion or modernization with Du Pont's help, you can be sure that every significant detail of your bleaching operation will be expertly evaluated.

With your production requirements in mind, experienced Du Pont technicians will survey your present equipment and bleaching method. Using this information as a base, a group of specialists will then work-up a detailed recommendation. It will show you how you can reach your new production goals, economically and without a waste of valuable floor space.

If new equipment or extensive modifications are needed, a proposal and layout will be presented for your consideration. Du Pont will even help you put your final plan into operation and guide you in the training of operators.

Here are some of the other services offered to you by Du Pont.

On-the-Spot Help with any immediate bleaching problem from Du Pont textile specialists servicing all important textile centers.

Technical Literature. A wealth of up-to-date information on all phases of textile bleaching is always available from Du Pont at your request.

Confidential Bleachery Survey to help you in maintaining or improving efficiency of your bleaching operation. A confidential report summarizes results and makes recommendations for your guidance.

Peroxide Bleaching Systems. More Du Pont peroxide bleaching systems are in use throughout the world than any other continuous system. We can show you how these processes can be adapted to *your* bleaching needs.

Bulk Storage Systems. Technical help with installation of equipment for buying and storing hydrogen peroxide in money-saving tank truck and tank car lots.

Top-Quality Hydrogen Peroxide. You're assured of prompt, dependable delivery of "Albone" hydrogen peroxide—in drums, tank trucks, and tank car lots.

For full details, call your nearest Du Pont representative or write to: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Del.

CALL DU PONT FOR HYDROGEN PEROXIDE AND A *COMPLETE* TEXTILE BLEACHING SERVICE

ALBONE

REG. U.S. PAT. OFF.

HYDROGEN PEROXIDE

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

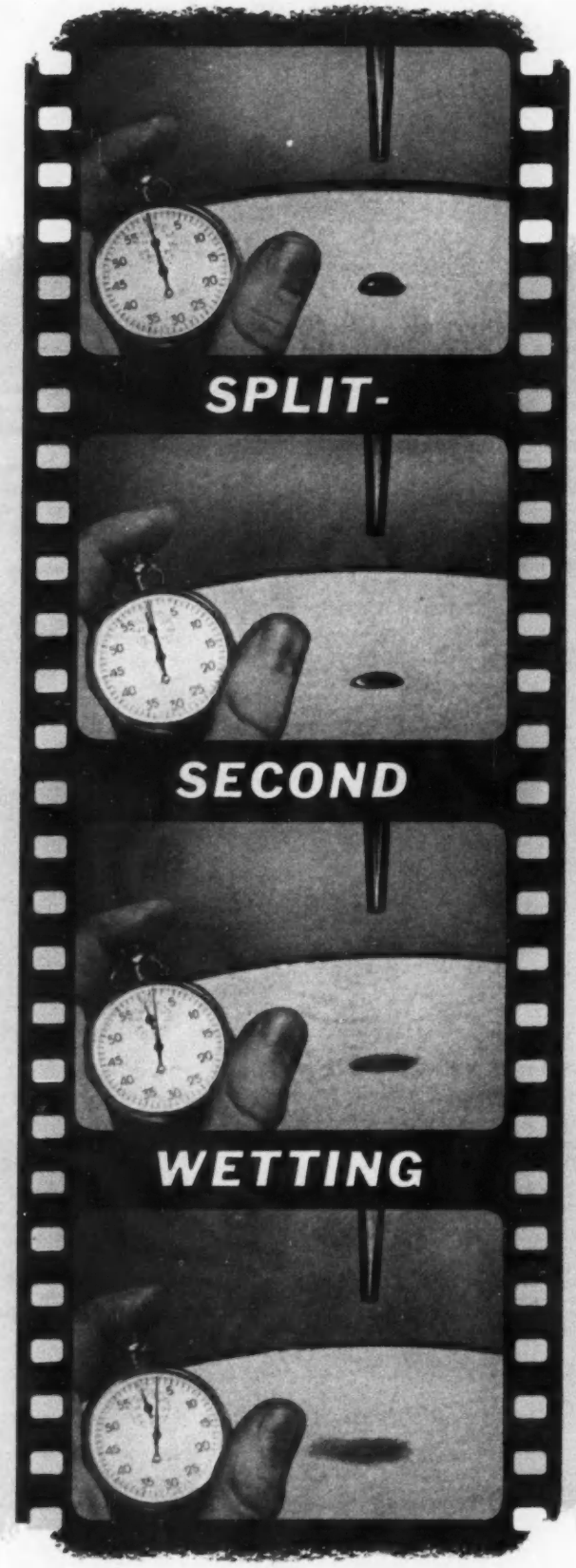
In Boston, call Hancock 6-1714; in Charlotte, Franklin 5-5561; in New York, Longacre 3-6440; in Philadelphia, Kingsley 5-1900.

OTHER DISTRICT SALES OFFICES TO SERVE YOU

Baltimore	Dallas *	New Orleans *
Chicago	Detroit	Oklahoma City *
Cincinnati	Houston *	San Francisco
Cleveland	Kansas City *	Tulsa *
Corpus Christi *	Los Angeles	Wichita *

Export Division, Wilmington 98, Del.

*Barada & Page, Inc.



NOPCOWET® 86-A

is highly effective as a wetting agent

...as a rewetting agent, too!

If you haven't tried Nopcowet 86-A, it's high time you did. You'll find this new concentrated Nopco product exceptional as a wetting and penetrating agent with either neutral or dilute acid and alkaline solutions.

You'll find it exceptionally fast. You'll find it economical. You'll soon say it's unequaled for wetting out cotton piece and knit goods. It is also used in stock, package, and pad dyeing operations. Using the same product as both wetting and rewetting agent will save you much fuss and bother—and money.

Write today for testing samples.

Nopco Chemical Company,
172 Fuller St., Harrison, N. J.

NOPCO

PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif

Newest Editions of SOLVAY'S TECHNICAL BULLETINS

• Contain data, research material and analytical procedures for ready reference —detailed information that may help you improve your present process.

SOLVAY'S Technical and Engineering Service Bulletins cover a wide scope of subjects. Their range includes: the physical and chemical properties, use, handling and storage of soda ash, caustic soda, etc. . . . procedures to be followed in analysis of water, liquid chlorine and bleach . . . the use of calcium chloride in refrigeration . . . and the treatment of municipal and industrial water with alkalies and chlorine.

These highly informative books were written by SOLVAY'S staff technicians and engineers. They contain standard tables and charts along with original data compiled from field experience and research by members of the world's largest alkali laboratory.

All of SOLVAY'S Technical and Service Bulletins are available without cost or obligation*. Fill in the coupon below, indicating the bulletins you want.

*In Western Hemisphere Countries

SOLVAY

MAIL COUPON FOR YOUR COPIES

SOLVAY PROCESS DIVISION
ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

Gentlemen: Please send me without cost or obligation*, the SOLVAY Technical and Engineering Service Bulletins I have checked:

- ☐ No. 4—Calcium Chloride in Refrigeration
- ☐ No. 5—Soda Ash
- ☐ No. 6—Caustic Soda
- ☐ No. 7—Liquid Chlorine
- ☐ No. 8—Alkalies and Chlorine in the Treatment of Municipal and Industrial Water
- ☐ No. 9—Analysis of Alkalies
- ☐ No. 11—Water Analysis
- ☐ No. 12—The Analysis of Liquid Chlorine and Bleach
- ☐ No. 14—Chlorine Bleach Solutions
- ☐ No. 16—Calcium Chloride

NAME_____

ORGANIZATION_____

ADDRESS_____

CITY_____ ZONE____ STATE_____ AE-3

SOLVAY PROCESS DIVISION
Allied Chemical
ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

BRANCH SALES OFFICES

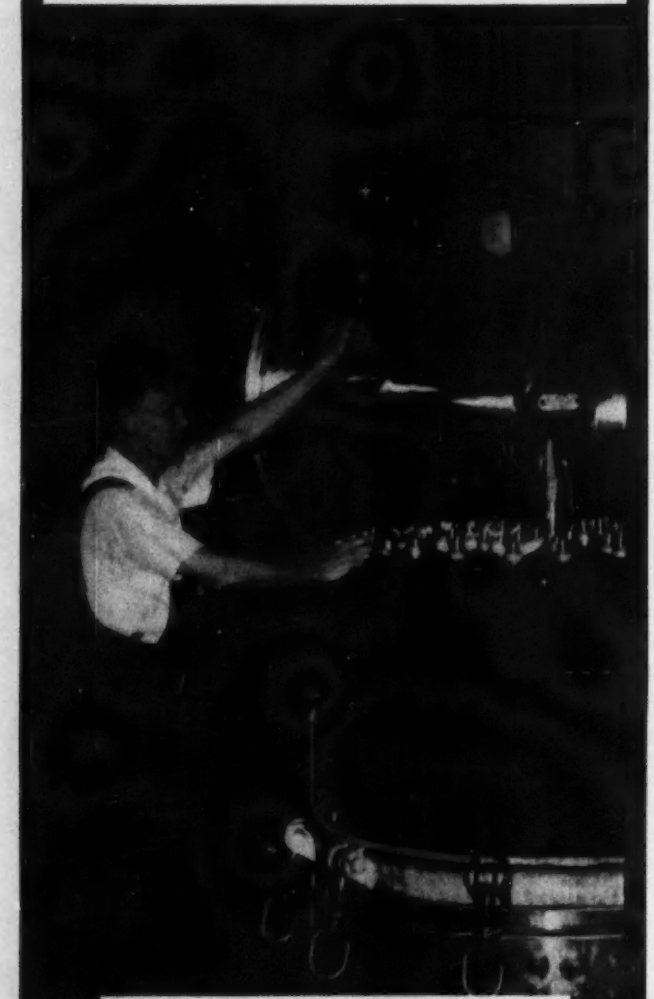
Boston • Charlotte • Chicago • Cincinnati
Cleveland • Detroit • Houston • New Orleans
New York • Philadelphia • Pittsburgh
St. Louis • Syracuse

Soda Ash • Snowflake® Crystals • Potassium Carbonate • Calcium Chloride • Sodium Bicarbonate • Ammonium Bicarbonate
Cleaning Compounds • Caustic Potash • Sodium Nitrite • Ammonium Chloride • Chlorine • Caustic Soda • Monochlorobenzene
Para-dichlorobenzene • Chloroform • Ortho-dichlorobenzene • Methylene Chloride • Methyl Chloride • Carbon Tetrachloride

SUPERIOR FASTNESS PROPERTIES
from
JESCOFIX
DYE FIXATIVE
FASTER to
WASHING
PERSPIRATION
WET-IRONING
WET-PROCESSING
Maximum Resistance to Bleeding of Prints Into Discharges or Grounds • Maximum Retention of Color Sharpness in Cross Dyeing • USED WITH STANDARD EQUIPMENT, APPLIED IN LAST RINSE AFTER DYEING
JERSEY STATE CHEMICAL CO.
SOUTHERN REPRESENTATIVE: CHARLES WATERS
2919 WEST GRACE STREET, RICHMOND, VIRGINIA
© 1955 J.S.C. Co.

Armour Energetic® cuts crocking and costs at Standard-Coosa-Thatcher..

..and will at your mill!



Standard-Coosa-Thatcher uses Energetic to minimize crocking on this naphthol-dyed yarn—and for maximum detergency and economy in other dyeing and bleaching processes.

"None of the synthetics had solved our crocking problem—until we tried Armour Energetic. That did it, and we've been using Energetic successfully in our dyeing and bleaching processes for the past three years." These are the words of Mr. H. H. Eagar, manager of quality control and development for Standard-Coosa-Thatcher Company. Energetic has proven itself in his mill and in many, many others—why not try it in *yours?*

Here's how Energetic will cut costs for you! A powerful, concentrated nonionic synthetic detergent, Energetic is supplied *90% active*—it takes only one pound to do the job of 3 full pounds of anionics. This adds up to a savings per job of about 21¢ with every pound of Energetic you use. And you can add builders to Energetic to cut costs even more.

Test Energetic now by this trial-order plan! Send the coupon for free test samples of Energetic and complete booklets on all three Armour Energetic products. Or, for quick delivery on a 5-gallon trial drum, place an order right in the coupon below. Start reducing your scouring problems and costs now!

FREE SAMPLE AND TRIAL ORDER BLANK

Armour Industrial Soap Department
Armour and Company, 1355 W. 31st St., Chicago 9, Ill.

Please send me:

- ☐ FREE! Sample of ENERGETIC
- _____ 5-gallon drums of ENERGETIC @ $13.86 each
- ☐ Free Booklet, ENERGETIC and ENERGETIC 5
- ☐ Free Booklet, ENERGETIC W-100 (Instant wetting agent)
- ☐ Bill me ☐ Check enclosed ☐ Money Order

Your money back if not completely satisfied. For refund, simply ship us unused portion.

Name _____ Title _____

Firm _____

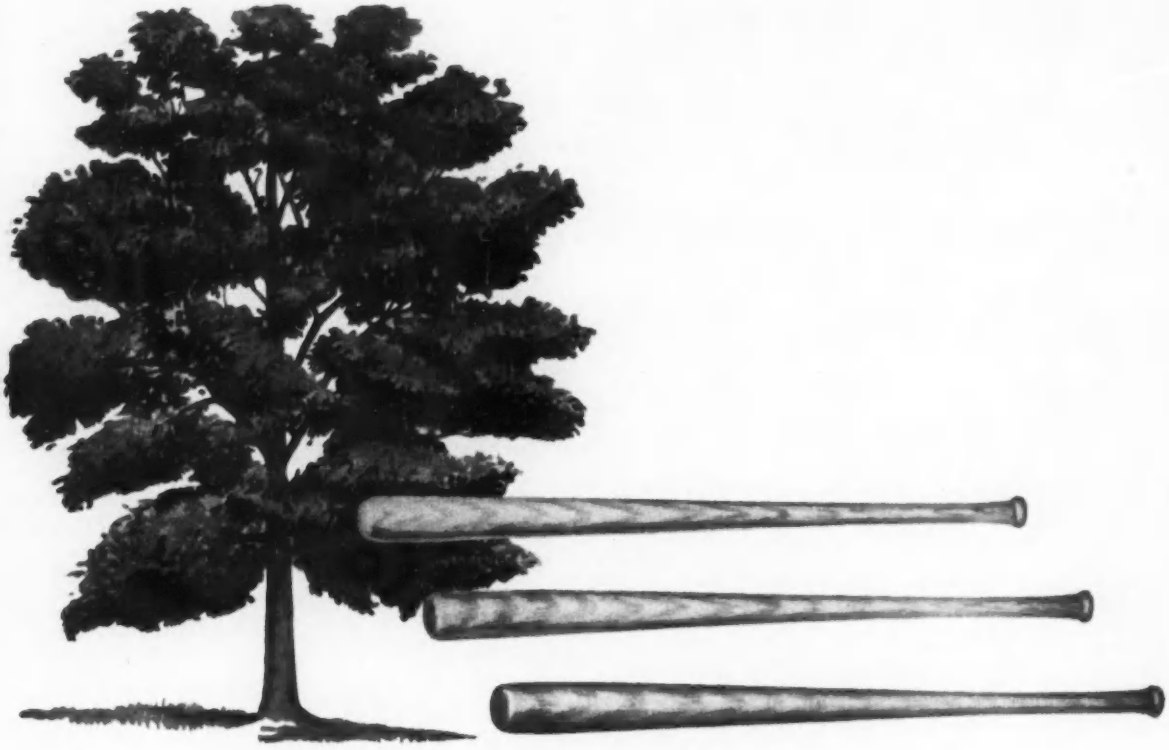
Address _____

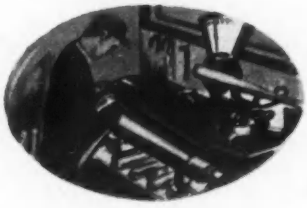
City _____ Zone _____ State _____

ARMOUR

Industrial Soap Department

D3





Home runs start here

HOME RUNS START . . . *where?*

In the ball-park? More likely in the forest, for the finest bats need tough, straight-grained ash. Add time for aging. Skill in shaping. *Result:* a bat with a game-winning "finish."

In bleaching and dyeing operations also, fine finishes don't "just happen." They, too, take planning . . . take skill . . . take a de-sizing agent you can rely upon . . . take *Diastafor.*

Diastafor de-sizing agent is worth cheering about. No matter what your working conditions—with various lots . . . with variations in water and sizing formulas . . . with cottons, rayons or mixed goods—you will find Diastafor a champion every time.

For Diastafor *works.* It works in an unusually wide range of temperatures and pH, a range sure to satisfy your every enzyme de-sizing requirement. It works in either the continuous or batch process. It works with ease, speed and economy. Remember: *it has worked as a winner for over 44 years!*

Diastafor is available in 3 types: L, L_2 and D. For further information about these, or for any other questions you may have, please write us. Standard Brands Incorporated, *Diastafor Department,* 595 Madison Avenue, New York 22, N. Y.

DIASTAFOR

A TRADE MARK OF STANDARD BRANDS INCORPORATED

DYEING AND FINISHING COSTS CUT WITH "DUPONOL"* RA— DU PONT'S MORE EFFICIENT SCOURING AGENT!

You need less to do the job with Du Pont "DUPONOL" RA—because it's more potent in removing solid soils, waxes and oils. In most cases, maximum detergency is achieved at concentrations of .15% or lower!

You can do more jobs with Du Pont "DUPONOL" RA. Several mills using "DUPONOL" RA surface active agent have found it effective for *all* wetting and detergent uses. This simplifies inventory, purchasing, handling and formulating problems.

Your dyeing job is easier with Du Pont "DUPONOL" RA—because it gives top scouring performance in preparing fabrics for dyeing. And because of the high detergency, wetting and penetration properties found in "DUPONOL" RA, even fabrics constructed of yarns with high twist are penetrated in the dyeing operations following scouring. Often, less softener is required following boil-off with "DUPONOL" RA.

What's more, you get controlled foaming! "DUPONOL" RA provides sufficient foam to suspend solid soils, waxes and oils, without causing excessive foam build-up.

For complete information, write to E. I. du Pont de Nemours & Co. (Inc.), Dyes and Chemicals Division, Wilmington 98, Delaware.

DU PONT

DUPONOL® RA...

liquid detergent

* REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

DU PONT

REG. U.S. PAT. OFF.

GET THIS *NEW* CHEMICALS CATALOGUE *by return mail!*

Antara presents a new and completely revised edition of its chemical catalogue, giving basic information on the chemicals it produces.

Information on chemical composition, physical properties and application is given on the established products and on new chemicals released in the past few months. In addition, there is a listing of Antara's intermediates.

For your free copy of the new Antara Chemicals Catalogue, fill in the coupon below and mail it today.

ANTARA gaf

ANTARA® CHEMICALS

A SALES DIVISION OF GENERAL ANILINE & FILM CORPORATION

435 HUDSON STREET • NEW YORK 14, N. Y.

Please send me the new Antara Chemicals Catalogue.

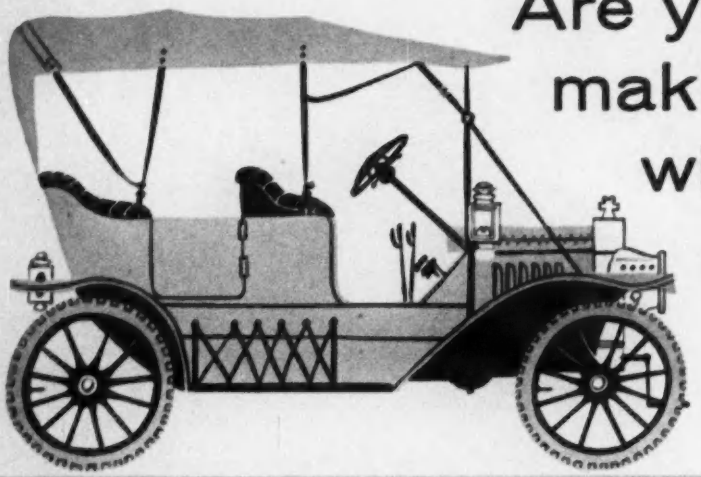
NAME_____

TITLE_____

FIRM_____

ADDRESS_____

AD



Are you still making Brine with "Model T" methods?

Then Save Time and Money with

THE LIXATE PROCESS

In a single piece of equipment, The Lixate Process combines a method of dissolving rock salt without agitation and a method of filtration.

MAKES BRINE AUTOMATICALLY

The Lixator makes and filters all the brine you want or need with no human aid whatever and can be located *anywhere*—even hundreds of yards from buildings and points of use.

UNIFORM QUALITY AND STRENGTH

The Lixator produces *only* 100% fully-saturated brine, self-filtered, crystal clear. May be accurately reduced in strength, without testing, without delays.

PIPED TO POINTS OF USE

Turn a tap, there's your brine—*where* you want it, *when* you want it. No handling of salt or finished brine. Economy! Convenience! Efficiency! All Lixator installations are custom-engineered.

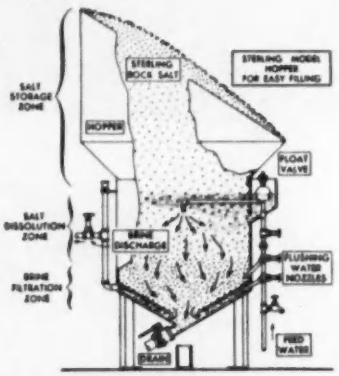
EVAPORATED SALT DISSOLVERS, TOO

Rock Salt or Evaporated Salt—International provides both in all forms. It provides also any technical advice on salt, brine, or auxiliary equipment, required by users, for either kind of salt.

INTERNATIONAL SALT COMPANY, Inc.
Scranton, Pa.

SALES OFFICES: Atlanta, Ga. • Chicago, Ill. • New Orleans, La. • Baltimore, Md. • Boston, Mass. • Detroit, Mich. • St. Louis, Mo. • Newark, N. J. • Buffalo, N. Y. New York, N. Y. • Cincinnati, O. • Cleveland, O. • Philadelphia, Pa. • Pittsburgh, Pa. • Richmond, Va.

ENGINEERING OFFICES: Atlanta • Buffalo • Chicago



HOW LIXATOR WORKS

Rock Salt, fed by gravity, keeps tank filled. Water in dissolution zone dissolves salt, becomes 100% saturated brine. Lower bed of rock salt acts as filter. Result—crystal clear, fully saturated brine.

It costs nothing to find out what The Lixate Process can do in YOUR plant! SEND THIS COUPON NOW!

International Salt Co., Inc.
Industrial Division, Scranton 2, Pa.

Without obligation, please have an International Industrial Engineer call to show me how The Lixate Process might be adapted to my plant.

*Name*_____ *Title*_____

*Firm Name*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

A new blue freshness for fabrics...
Alcian Blue
Here is a truly exclusive color . . . only Arnold, Hoffman can offer you the completely unique advantages of exciting ALCIAN BLUE!
You can dye ALCIAN BLUE on cotton piece goods or yarn in packages and you can print this fabulous color on cottons . . . Ahco technical demonstrators are available to assist you in application techniques.
Send for a sample swatch of the one and only ALCIAN BLUE!
ARNOLD, HOFFMAN
PROVIDENCE • RHODE ISLAND
Associated with Imperial Chemical Industries Ltd., London, England
ARNOLD, HOFFMAN & CO., INCORPORATED • EST. 1815 • PROVIDENCE, R. I.
Offices and Sales Service Laboratories: Providence, R. I.
Atlanta, Ga., Charlotte, N. C., Teterboro, N. J.
DYES

For Your

VAT BROWN *Combinations*

. . we offer the following NEW and ORIGINAL Mayvat* Dyestuffs especially designed to match practically every Brown shade you may desire.

MAYVAT Yellow Brown 3R
MAYVAT Yellow Brown RC
MAYVAT Maroon FB
MAYVAT Red Brown RCN
MAYVAT Brown UF

For *economy, ease of dyeing* and *good light* and *washfastness,* these new dyeing colors cannot be excelled.

For information on these MAYVAT Brown Colors, write, wire or phone—

*Reg. Trade Mark

CHEMICALS O·M·B INC. DYES

OTTO B. MAY, INC.

DYESTUFF MANUFACTURERS SINCE 1917

52 AMSTERDAM STREET NEWARK 5, NEW JERSEY

SELLING AGENTS

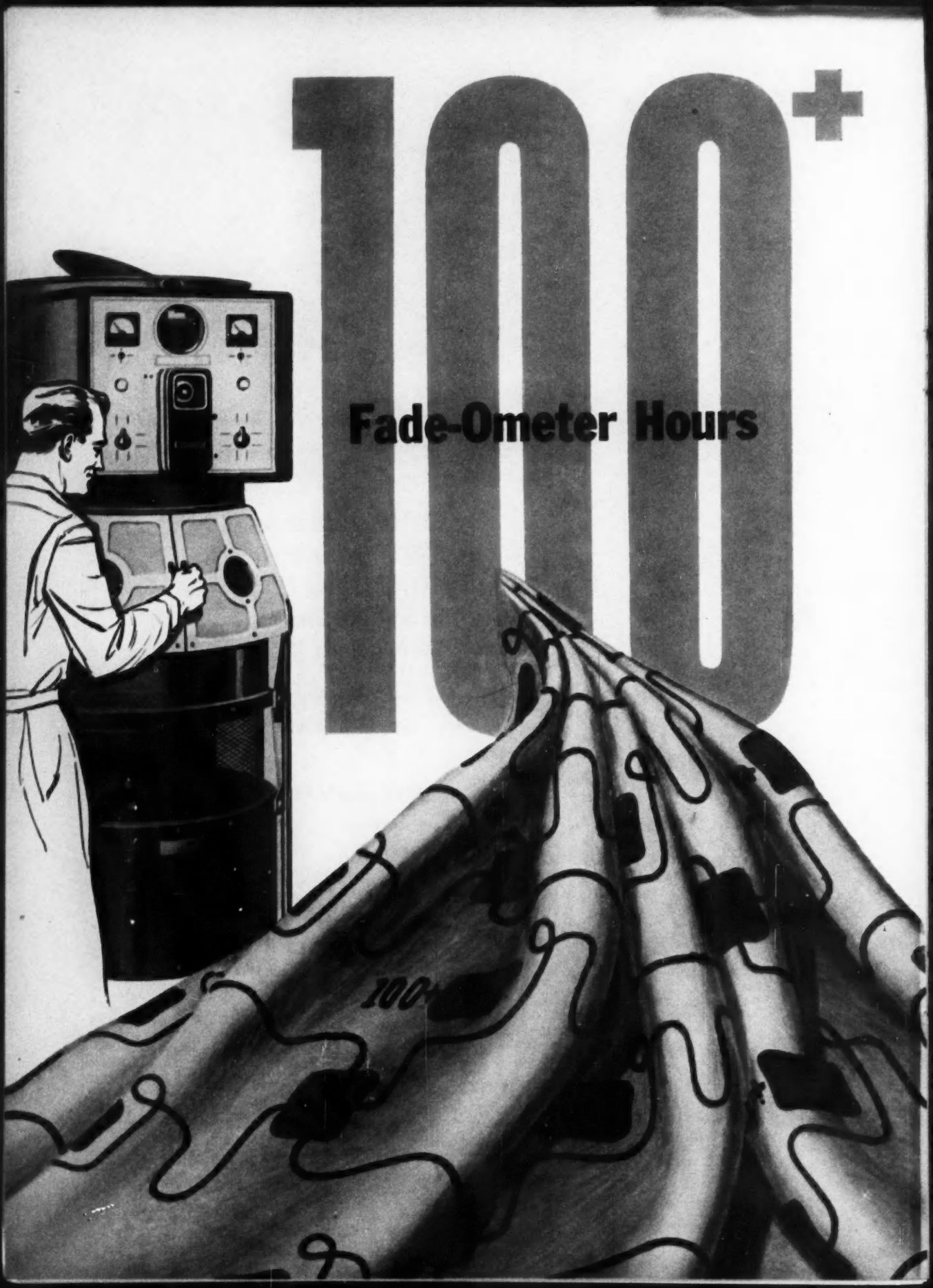
CARBIC-MOSS CORPORATION

OFFICES

2511 LUCENA ST., CHARLOTTE 6, N. C. • 451-453 WASHINGTON ST., NEW YORK 13, N. Y.

BRANCHES

PROVIDENCE • PHILADELPHIA • HAMILTON, ONT. • COLUMBUS • LOS ANGELES


100+
Fade-Ometer Hours
100

Aridye COLORS

First Choice for Printing Drapery Fabrics

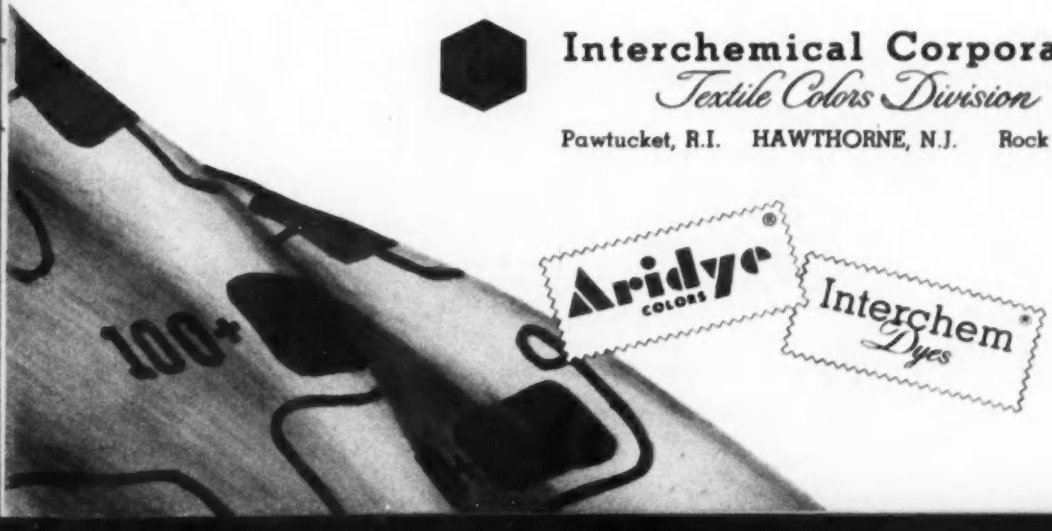
There are four good reasons why selected Aridye Colors are the first choice of leading printers for both machine and screen printing drapery fabrics. One reason is:

There is a full range of Aridye Colors which withstand 100 or more hours Fade-Ometer exposure without appreciable shade change or fading.

For complete information on this range of light-fast Aridye Colors for printing drapery fabrics, write to the Textile Colors Division's office nearest you.

P.S. We'll be glad to give you three other good reasons which account for the increasing use of Aridye Colors for printing draperies.

Interchemical Corporation
Textile Colors Division
Pawtucket, R.I. HAWTHORNE, N.J. Rock Hill, S.C.

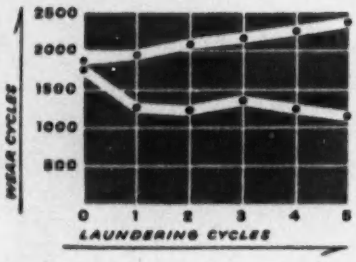


News about

B. F. Goodrich Chemical *raw materials*

Which one will sell at a premium price?

DO you know that you can produce a denim which will wear 2 to 3 times as long, simply by using a Hycar *permanent* size? And that's the sort of benefit that commands a premium price at the retail counter. Check these Hycar advantages:



LAUNDERING *INCREASES* ABRASION RESISTANCE . . . The graph at lower left shows the effects of laundering on the abrasion resistance* of 11-ounce whiteback denim, warp-sized with (No. 1) Hycar latex and (No. 2) commercial starch.

SUPERIOR HAND . . . Hycar sized denims have a softer, more pleasing hand . . . maintain it through numerous washings.

EXCELLENT COLORFASTNESS . . . Hycar sized denims don't run or stain when they go into the washing machine with other fabrics. They resist fading, keep their new look much longer.

HYCAR IMPROVES OTHER FABRICS . . . Hycar latex, applied to cotton sheeting as an after-treatment, increases wear resistance up to 350%. Hycar latex blended with starch greatly increases the seam strength of rayons. Blended with U-F resins, Hycar upgrades rayon-acetate fabrics without loss of crease resistance.

*As shown by the Taber Abraser

You can upgrade your own production and enhance its sales appeal with Hycar latex. It's easy to use. To find out how, please write Department CQ-2, B. F. Goodrich Chemical Company, Rose Bldg., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U.S. Pat. Off.
American Latex

GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

AULA

AULABRITE®

WATER DILUTABLE PIGMENT COLORS

THE MOST COLORS...

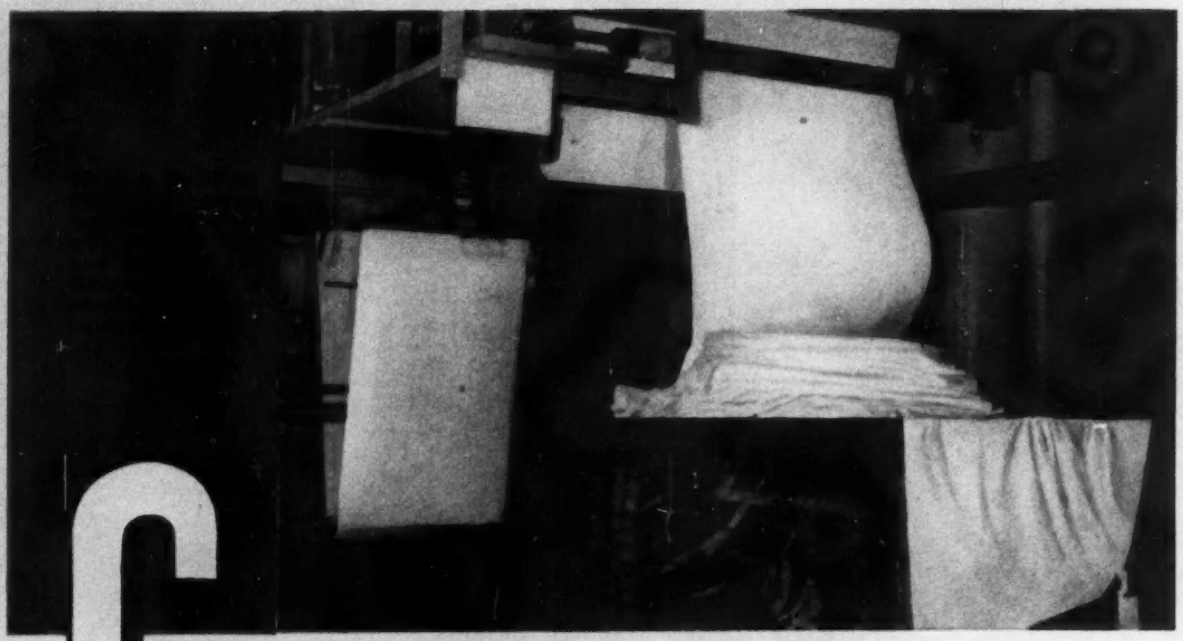
THE MOST *Beautiful* COLORS

FOR YOUR DOLLAR

Brighten your sales picture! Use AULABRITE when printing or pad dyeing with emulsion pigment colors. Scrub-fast *brilliant* colors, beautifully soft hand, good running properties—all at *significantly lower cost*—these are the reasons why AULABRITE is the bright idea on the textile horizon. Write for complete information.

AULA CHEMICALS, INC.

Box 494, 714 Division St., Elizabeth, N. J.
Telephones: Elizabeth 2-8184 • BArclay 7-5294



Controlled CHLORINE RETENTION

OF CREASE RESISTANT COTTON FABRICS!

Finished with STANSET LC, millions of yards of white cotton shirting fabrics — as made up by one of the largest shirting manufacturers — have withstood repeated commercial laundering *WITHOUT* noticeable yellowing or significant loss in strength due to the action of chlorine bleaching.

[redacted] YOUR OWN TRADE MARK

Leading cotton finishing companies are building valuable reputations for their own important trade marks with STANSET D 40 and STANSET LC.

INCREASED EFFICIENCY

STANSET D 40 and STANSET LC are new, highly efficient cross-linking compounds which *really* set the shrinkage of cotton fabrics with that additional bounce — at low cost!

EXCELLENT PHYSICAL PROPERTIES

Fabrics finished with STANSET D 40 and STANSET LC may be cured over a wide range of temperatures, from 250°F. to 340°F., for 70 to 90 seconds, to fit almost every fabric construction, assuring the highest crease resistance, tensile and tear, in conjunction with CONTROLLED CHLORINE RETENTION.

NEW STANSET EASY TO APPLY

The application of STANSET resins requires no equipment other than that now in use for resin treatment in mills and finishing plants.

WE WELCOME YOUR INQUIRIES ON STANSETS • WRITE OR CALL US TODAY

Our technical representatives are at your service.

HERE'S A MAN WHO CAN

cut costs in textiles

The ULTRAWETS are cutting textile processing costs with a combination of skills you seldom see. These superior alkyl aryl sulfonates can work wonders in *cotton scouring, wool scouring, soaping off and dye leveling.*

With proper use of the ULTRAWETS, you can forget such problems as hard-water precipitates . . . stubborn stains . . . and streaking.

The ULTRAWETS provide exceptional cleaning and wetting ability. In concentrations as low as 0.2%, the ULTRAWETS will thoroughly emulsify animal grease . . . in concentrations as low as 0.05% by weight of solution, the ULTRAWETS can speed wetting and dye penetration.

Economy in use is matched by economy in purchase, too. Bulk purchases offer substantial savings. Shipments can be arranged to suit your storage facilities. Ask our sales engineer for full information on results and costs. Write directly to our branch office near you, or mail the coupon today.

ATLANTIC
PETROLEUM
CHEMICALS

THE ATLANTIC REFINING COMPANY
Dept. F-3, Chemical Products Sales
260 South Broad Street, Philadelphia 1, Pa.

Please send me information on the ULTRAWETS for use in ☐ cotton scouring ☐ wool scouring ☐ soaping off ☐ dye leveling.

Name _____

Firm _____

Street _____

City _____ *State* _____

Philadelphia, Providence, Charlotte, Chicago

In the West: L. H. Butcher Co.

In Canada: Naugatuck Chemicals Division of Dominion Rubber Company, Ltd.

In Europe: Atlantic Chemicals SAB, Antwerp, Belgium

NON-YELLOWING

LUPOMIN NY

A new, more effective ammonium quaternary compound, with antistatic properties, for softening and finishing textiles

Newly improved Lupomin NY is a superior softening agent for a wide range of fabrics—white stays white—no after yellowing even at high temperatures. On dyed materials, shades do not change and are brighter. Very small quantities of Lupomin NY give a soft, smooth, supple hand, and odorless finish. In paste form, Lupomin NY is just as effective in a neutral or acid bath—it mixes well with gelatin, gums, starches and dextrines.

Complete data proving the versatility of Lupomin NY as well as a sample for a test run may be had by writing:

JACQUES WOLF & CO.
Chemicals PASSAIC, N.J.

Plants in: Clifton, N.J., Carlstadt, N.J., Los Angeles, Calif.

LOTOL®

BACKS UP your carpet sales story!

Tufted carpeting is really catching on with value-conscious homemakers. One big reason is this carpet's all-important backing of rubber-plastic. It's your big value story!

Show your customers how rubber-plastic backing:

- **Permanently anchors the pile.**
- **Substantially improves hand and body.**
- **Maintains dimensional stability. (eliminating puckering and shrinking)**
- **Permits repeated washings without fear of breaking down the backing.**
- **Prevents raveling at seams and edges.**
- **Prolongs carpet life.**

This backing material, custom-compounded by Naugatuck under the trade name Lotol, adds greatly to the quality characteristics of the carpet... permits substantial savings in its manufacture... makes possible its popular price!

Naugatuck will gladly work with any carpet manufacturer to provide a Lotol compounded to meet its requirements and price.

NAUGATUCK CHEMICAL
Carpet Fabricating Accessories:

RUG-SEALZ®—Carpet seaming adhesive.
KWIK-GRIP® TAPE—Carpet seaming tape with metal grippers for face-up sealing.
RUG-SEALZ TAPE—Seaming tape ideal for rubber-backed cotton and synthetic-tape-yarn carpeting.
HEAT-SEALZ TAPE—For binding rugs and fabricating rubber cushions.
AUTOMATIC IRON with attachment for applying rug binding.

SOLD ONLY THROUGH DISTRIBUTORS
Write us for name of distributor in your area.

World's Largest Latex Producer and Compounder

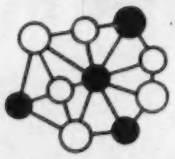
Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

US RUBBER

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • Memphis • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario
Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • Cable Address: Rubexport, N.Y.

WICASETS AND **WICALOIDS** DEVELOPMENTS OF WICA, OFFER UNLIMITED RANGE OF APPLICATION. **WICASETS** ARE EMULSION POLYMERS AND CO-POLYMERS.



WICALOIDS ARE LATEX

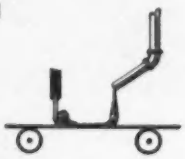
COMPOUNDS. BOTH ANSWER THE PROBLEMS OF THE WET

PROCESSOR OF WOVEN

AND NON-WOVEN FABRICS (SYNTHETIC AND NATURAL) AND WARP YARNS.

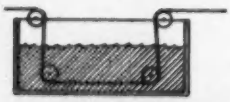
WICASETS AND **WICALOIDS** ARE USED IN ROLLER COATING,

PUDDLE COATING,



SPRAY COATING,

AND IMPREGNATION.



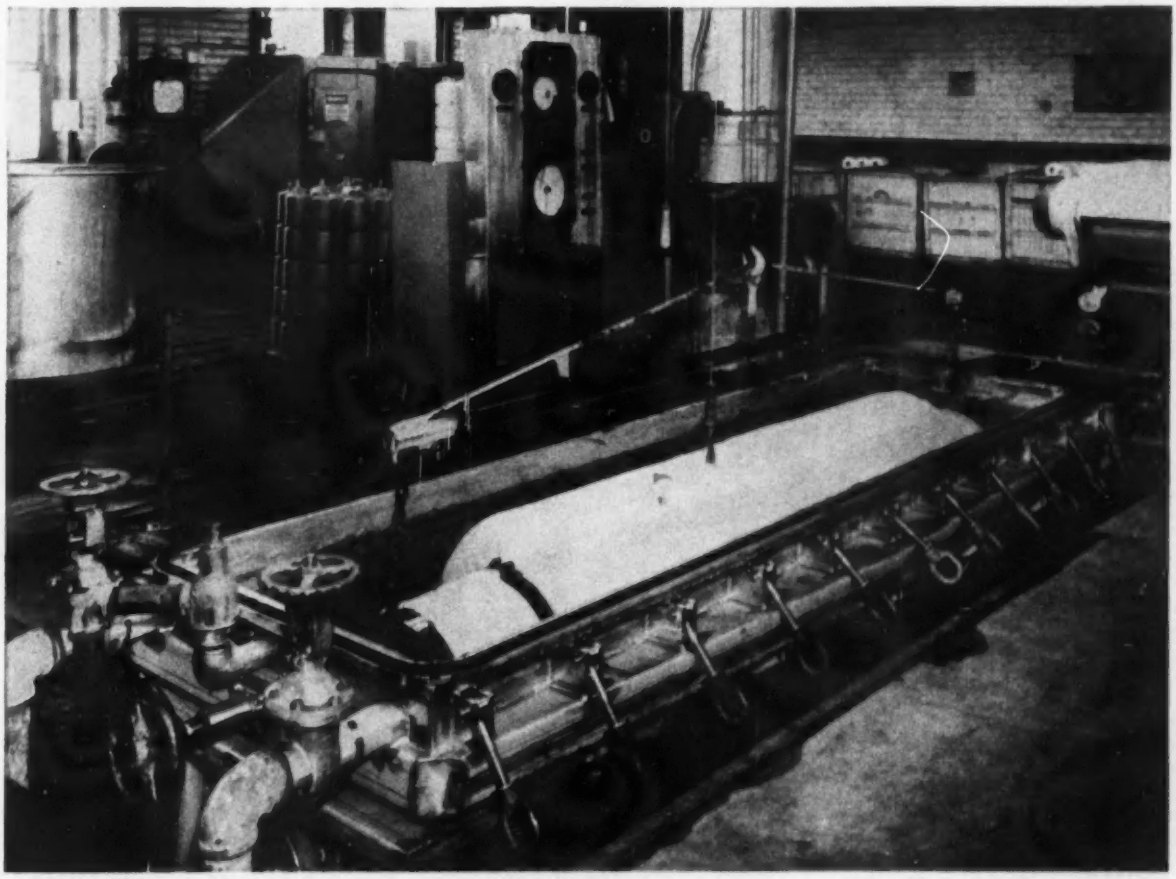
IDEAL IN WORKING WITH FLAT GOODS AND PILE FABRICS. **WICALOIDS** ARE USED ON JUTE, SISAL, AND RAMIE PADS. WICA'S RESEARCH

DEPARTMENT WILL SUPPLY YOU WITH THE ANSWER TO YOUR PROBLEM UPON REQUEST.

Wica

WICA CHEMICALS, INCORPORATED

OLD CONCORD ROAD • CHARLOTTE, NORTH CAROLINA



Taylor controlled Burlington Pressure Dye Machine installed at *Munsingwear, Inc.*

PICTURED ABOVE is a new Burlington Pressure Bleach, Boil-off and Dye machine recently purchased by Munsingwear, Inc. for use on tricot, and other knitted and open weave fabrics. With liquor being circulated through the machine at the rate of 1,500 gallons per minute the control of temperature and pressure is all important.

The Taylor Time-Schedule Temperature Controller automatically regulates rate of rise, hold time and temperature according to a predetermined ideal schedule. Pressure gages on either side of the controller indicate inside-out and outside-in pressures.

The Taylor control system saves money in at least four important ways:

1. It puts the whole process beyond the hazards of manual operation and human memory.

2. It assures a uniformly dyed product.

3. It makes possible a range of colors hitherto extremely difficult to obtain.

4. It saves labor through less material handling and shorter dyeing time.

When it comes to automatic control systems for dyeing, whether it's beam, piece, skein, package or top, Taylor engineers have the experience and the know-how based on many years of successful application in the Textile industry. Call your Taylor Field Engineer for practical advice and complete details. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

do metal impurities make TROUBLE for you?

KALEX works like magic!!!!

★ in vat, chrome, and naphthol dyeing!

★ for producing more brilliant shades!

★ in Kier boiling!

★ in peroxide bleaching operation!

★ in mercerizing!

★ for removing iron stains!

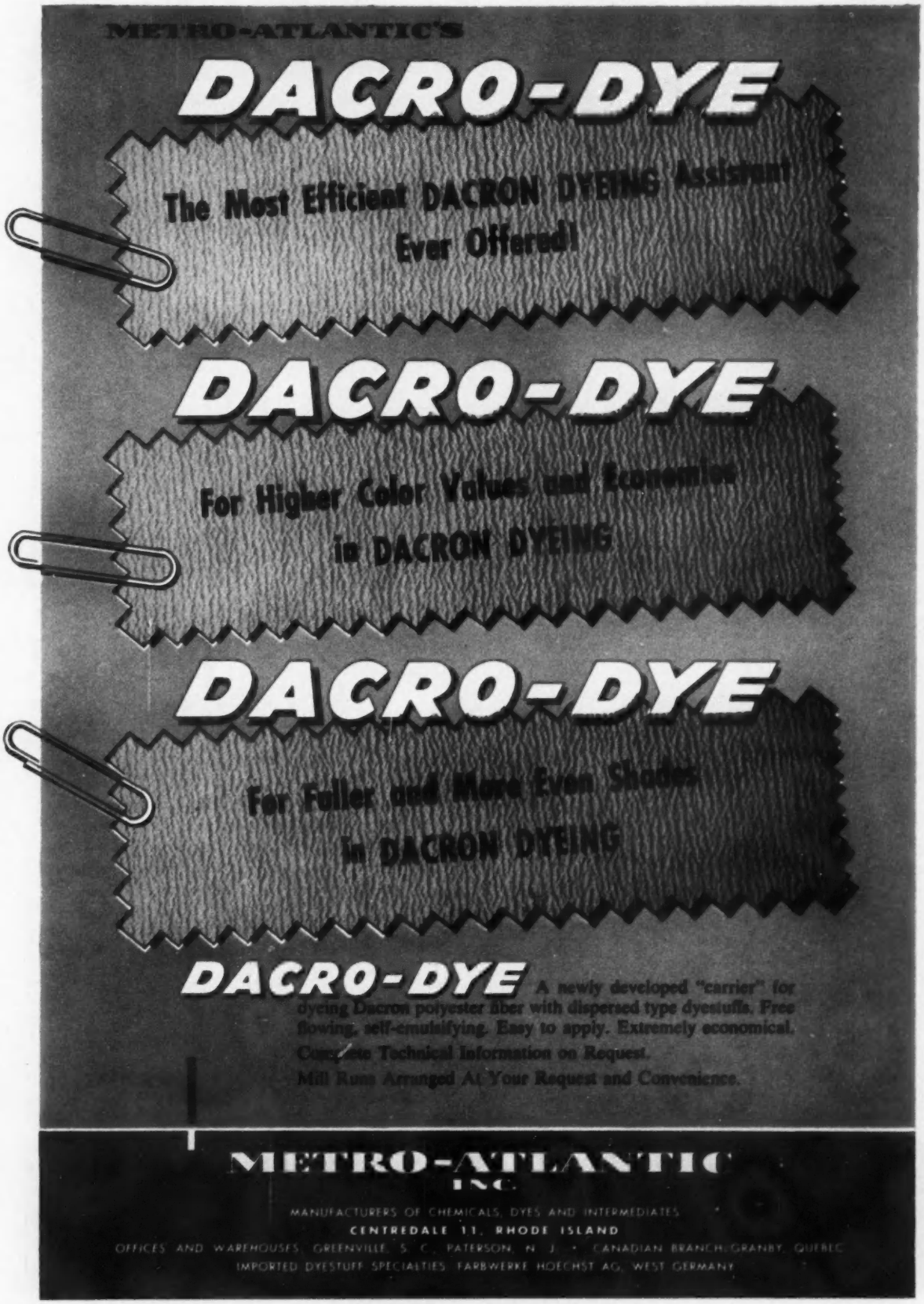
★ and in many other processes where trouble exists!

The KALEX products are organic sequestering agents, or water-soluble ion exchangers. They have the property of binding and deionizing heavy metal and alkali earth ions, without removing them from solution.

"Get to the HART of the trouble... get KALEX!"

Save yourself time, worry, and money! Write, wire, or phone *now* for a sample. Proof is in *performance*. Top technical service and prompt delivery are assured.

REQUIRED READING FOR COST-CONSCIOUS TEXTILE MEN!


METRO-ATLANTIC'S
DACRO-DYE
The Most Efficient DACRON DYEING Assistant Ever Offered!
DACRO-DYE
For Higher Color Values and Economies in DACRON DYEING
DACRO-DYE
For Fuller and More Even Shades in DACRON DYEING
DACRO-DYE
A newly developed "carrier" for dyeing Dacron polyester fiber with dispersed type dyestuffs. Free flowing, self-emulsifying. Easy to apply. Extremely economical.
Complete Technical Information on Request.
Mill Runs Arranged At Your Request and Convenience.
METRO-ATLANTIC INC.
MANUFACTURERS OF CHEMICALS, DYES AND INTERMEDIATES
CENTREDALE 11, RHODE ISLAND
OFFICES AND WAREHOUSES: GREENVILLE, S. C. PATERSON, N. J. • CANADIAN BRANCH: GRANBY, QUEBEC
IMPORTED DYESTUFF SPECIALTIES: FARBWERKE HOECHST AG., WEST GERMANY

The Standard of Color Perfection

SINCE

1876

Camel

TEXTILE

Dyes

Three-quarters of a century has built the name of Camel into a symbol of dependability for textile dyestuffs—75 years of uninterrupted service to the industry as a background of experience for prompt, efficient attention to all textile dyestuff requirements and problems.

Refer your dye problems to our laboratories . . . capable, experienced engineers are ready to serve you.

John Campbell and Company

75 HUDSON ST., NEW YORK CITY—BArclay 7-6228

2520-22 N. BROAD ST., PHILA. 32, PA.—RAdcliff 5-7103

BRANCH OFFICES & WAREHOUSES: BOSTON • EAST CLEVELAND, OHIO • ATLANTA, GA.

What is BECCO service to the Textile Industry?

It is Peroxygen Chemicals...

Becco hydrogen peroxide for bleaching cotton, wool, animal fibers (including cashmere), synthetics and blends, and for dyestuff oxidation; Becco peracetic acid for bleaching many synthetics and blends; Becco ammonium persulfate for oxidation of sulfur dyes; sodium perborate for dye development.

It is Processes...

Continuous bleaching, continuous knit goods bleaching, kier bleaching, package machine bleaching, Becco cold bleaching (patented), processes for bleaching with peracetic acid ... these and other processes owe much of their development to Becco research.

It is Delivery...

Becco chemicals are manufactured, stored and shipped to reach Becco customers in perfect condition by tank car, truck or in drums from numerous filling stations and warehouses so located as to assure prompt delivery.

It is Technical Service...

Becco has modern laboratories, a large research staff, chemists for research or consultation in your plant. Representatives throughout the country are trained technical men.

It is Technical Literature...

Among interesting Becco bulletins available on request are:

2. Hydrogen Peroxide
4. Peracetic Acid 40%
29. Hydrogen Peroxide Dry-In Process for Bleaching Wool
30. Hydrogen Peroxide in the Manufacture of Viscose
35. Modification of Wool with Peroxygen Compounds
38. Oxidation of Vat Dyes on Cotton and Synthetics with Hydrogen Peroxide
52. Bleaching with Some Peroxygen Chemicals
53. Fluorescent Agents in Hydrogen Peroxide Bleaching of Knit Goods
60. Successful Bleaching of Types 670 and 200 Nylon
61. Knit Goods Bleaching Range

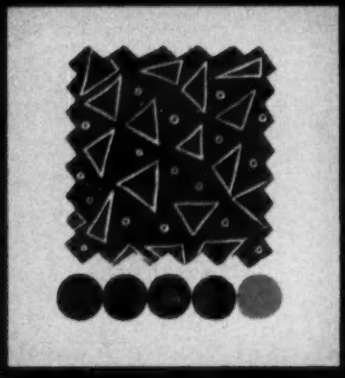
Write for Becco Technical Bulletins by number, or for Becco's Bulletin List.

BECCO CHEMICAL DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

fmc

STATION B, BUFFALO 7, N.Y.
BUFFALO • BOSTON • CHARLOTTE • CHICAGO
• NEW YORK • PHILADELPHIA • VANCOUVER, WASH.



For excellence in color values

use OK PRINT GUMS

Your most exacting requirements in printing and finishing are satisfied with the superior quality and controlled uniformity of Hubinger's OK Textile Starches. Try these outstanding products:

OK HUBCO PRINTING GUM #30FL provides a very sharp line, and shows excellent compatibility with alkali as well as acid colors. One of the most economical of all printing gums, it may be cooked on a Votator or in a kettle continuously at temperatures up to 185°F.

OK PRINTEX #200 is a premium-type printing gum which gives unusual color value and sharpness. Extremely heavy bodied, it is effective at low concentrations. Its excellent rinsability produces cloth with a soft hand.

OK LVS GUM virtually assures perfection in Pigment printing. Used as a thickener and carrier for the alkali, it has amazing stability and does not lump.

OK HUBCO #110 is a very clear, thin finishing starch, giving a slick hand without masking or hiding colors of the cloth.

OK BRAND

THE HUBINGER COMPANY
KEOKUK, IOWA
ESTABLISHED IN 1901

Ask your nearest Hubinger textile technical sales representative to show you the advantages of OK Textile Starches.

Ira L. Griffin & Sons
Southern Agents
P. O. Box 1576
Charlotte, N. C.
(Phone: Franklin 6-5583)

Joe R. Myers
1817 Dell Drive
Columbus, Georgia
(Phone: 7-2244)

Carl F. Merritt
Box 346-A
Piedmont, S. C.
(Phone: Greenville 2-0424)

New York Office
500 Fifth Avenue
New York 36, New York
(Phone: Longacre 5-4343)

Boston Office
192 State Street
Boston, Massachusetts
(Phone: Capitol 7-3268)

Also offices in Chicago and Los Angeles

American Dyestuff Reporter's

KNITTING ARTS EXHIBITION NUMBER

APRIL 11, 1955

your showplace at the Show . . .

Even though you may not be exhibiting at the 42nd Knitting Arts Exhibition April 25-29 at the Atlantic City Auditorium, you can still take a very active part in the activities, if you supply products or services to wet-processors. . . . You can still get your message across to the many, many wet-processing specialists and executives among the thousands of knitting mill men who will be carefully inspecting the show. You can *be* there without buying a booth, or even going to the Show.

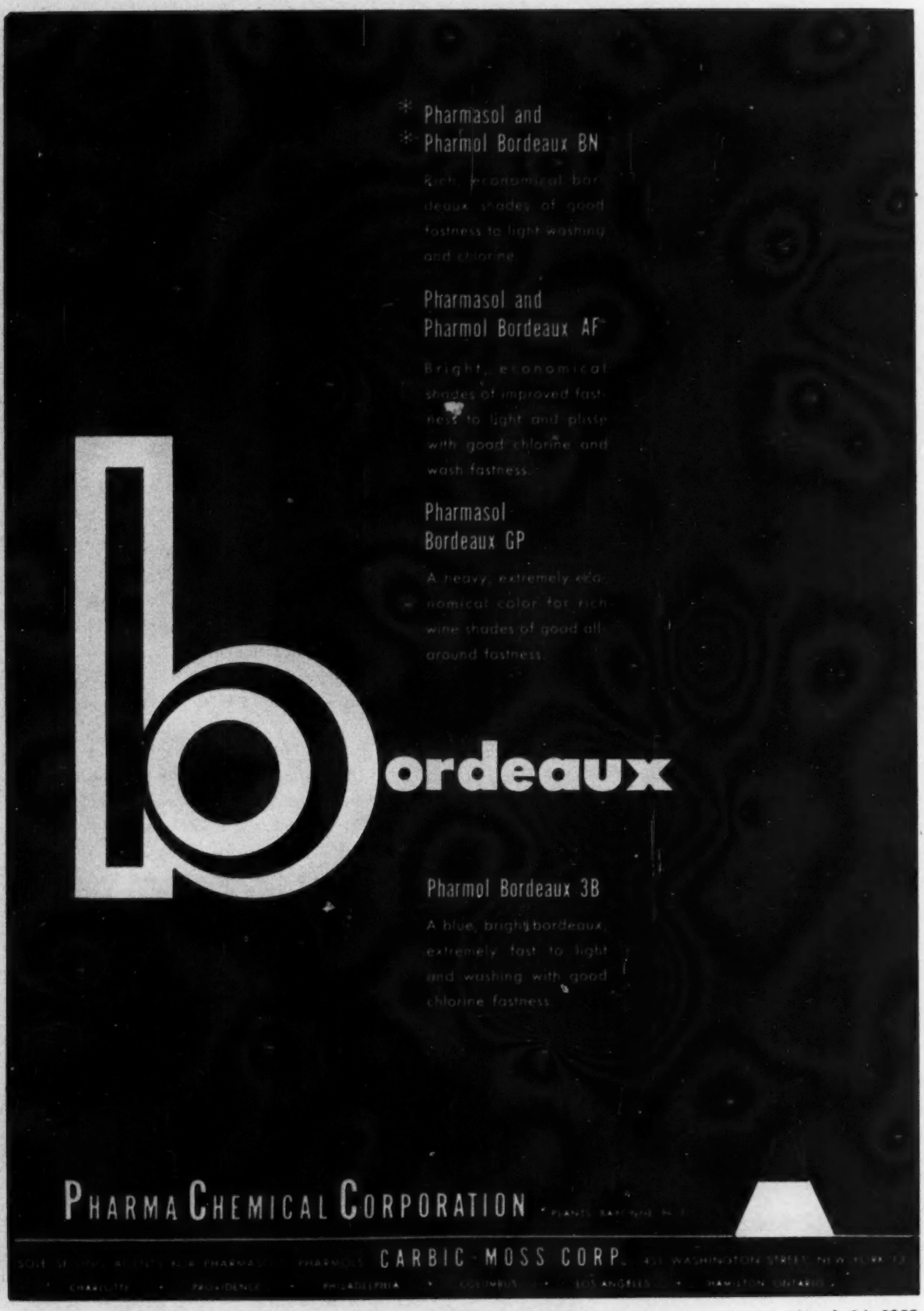
Your advertisement in the special KNITTING ARTS EXHIBITION NUMBER of American Dyestuff Reporter — the *only* publication devoted exclusively to the textile wet-processing industry — will be read and remembered by the wet-processing men attending K.A.E. They'll come to our booth (numbers 213 and 214), they'll pick up their bonus copies of the Reporter, and they'll see your advertising-sales message in their own wet-processing publication . . . IF you act *now* or very soon to reserve your advertising space in this special K.A.E. issue.

FOR ADVERTISING INFORMATION:

Herbert A. Stauderman
Advertising Manager

AMERICAN DYESTUFF REPORTER

44 East 23rd St. — SPring 7-9364
NEW YORK 10, N. Y.


Pharmasol and
Pharmol Bordeaux BN
Rich, economical bordeaux shades of good fastness to light washing and chlorine
Pharmasol and
Pharmol Bordeaux AF
Bright, economical shades of improved fastness to light and plisse with good chlorine and wash fastness
Pharmasol
Bordeaux GP
A heavy, extremely economical color for rich wine shades of good all around fastness
bordeaux
Pharmol Bordeaux 3B
A blue, bright bordeaux extremely fast to light and washing with good chlorine fastness
PHARMA CHEMICAL CORPORATION
CARBIC-MOSS CORP.

NORMAN A. JOHNSON
Editor

CHARLES A. WHITEHEAD
Managing Editor

MYRON D. REESER
Business Manager

HERBERT A. STAUDERMAN
Advertising Manager

JAMES A. DOYLE
Promotion Manager

FRANK R. MURPHY
Production Manager

LILLIAN M. THOMPSON
Circulation Manager

OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

AMERICAN

DYESTUFF REPORTER

Devoted to Textile Chemistry
BLEACHING • DYEING • PRINTING • FINISHING

Contents

VOLUME 44 MARCH 14, 1955 NUMBER 6

• *Proceedings of the American Association of Textile Chemists and Colorists*

FEATURE ARTICLES

Bibliography on Textile Waste..... P168
Stream-Sanitation Committee of the Piedmont Section

AATCC Symposium—Dyeing Session..... P191

I. Dyeing the Newer Synthetic Fibers in Blends with Cellulosic Fibers..... P191
Walter H Hindle

II. Dyeing Newer Blends of Wool with Synthetics P194
H Luttringhaus

III. Color Performance of Solution-Dyed Acetate P199
A F Tesi

IV. Solvent-Dyeing Acetate P202
Paul C Duggan

MISCELLANEOUS

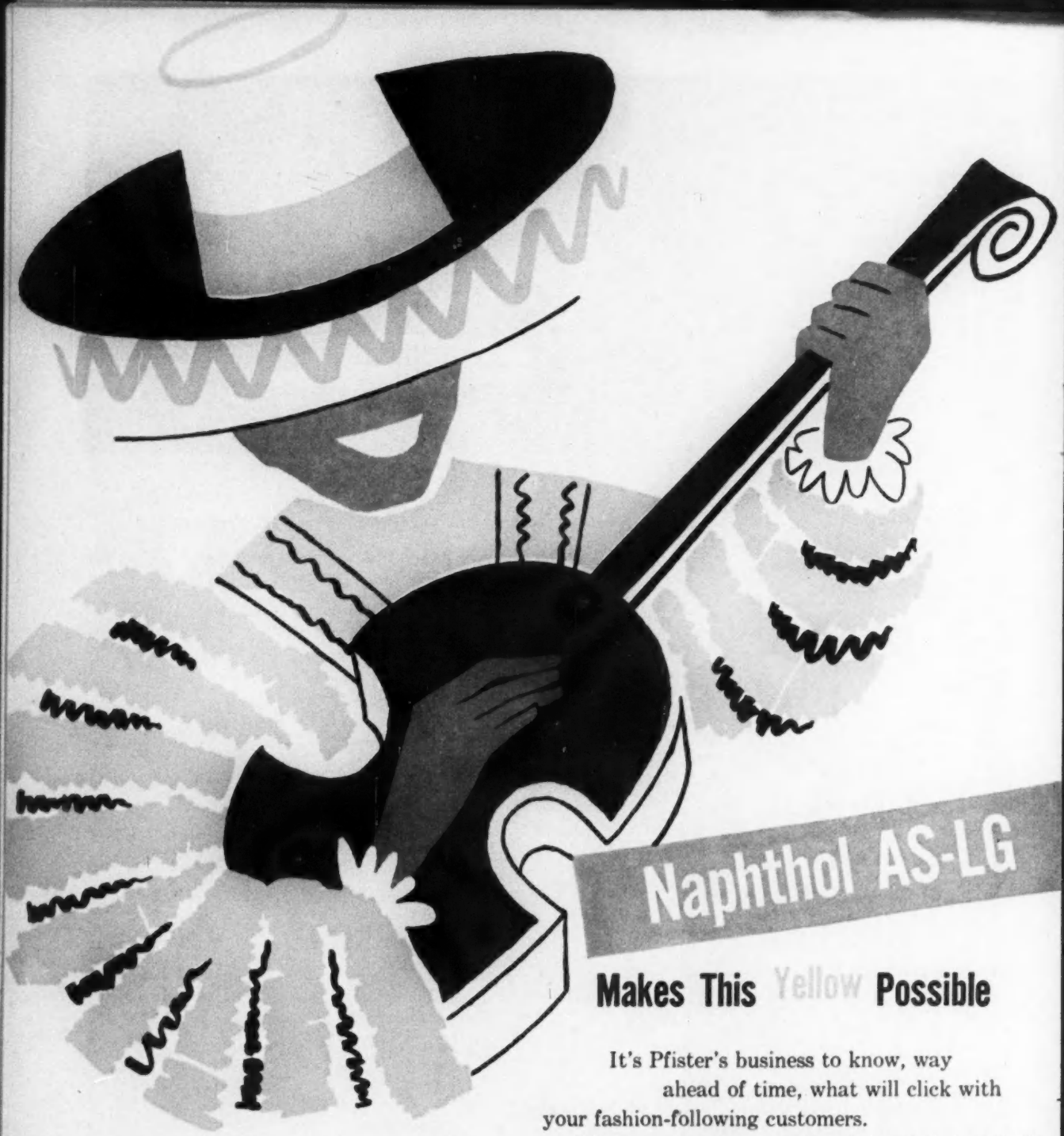
AATCC Calendar P161
Employment Register P161
Activities of the Local Sections..... P161
AATCC Administrative Newsletter #2..... P162
President's Message to Council..... P163
Membership Applications P163

Minutes:—
One Hundred and Ninety-Fifth Council Meeting P164
One Hundred and Eighty-Second Meeting—Technical Committee on Research.... P166

• *Departments*

Patent Digest 203
Paul Wengraf
News of the Trade..... 204
General Calendar of Coming Events..... 208

Copyright, 1955, Howes Publishing Co, Inc
Contents of previous issues can be found by consulting the Industrial Arts Index and the Engineering Index, Inc. at your library



Naphthol AS-LG

Makes This Yellow Possible

It's Pfister's business to know, way ahead of time, what will click with your fashion-following customers.

Yellow produced with Pfister's Naphthol AS-LG is the last word in light-fast, wash-fast brilliance—the last word in demand-creating color for fast moving merchandise.

Get sample and formula from Pfister.

Pfister Chemical Works
INC.

Ridgefield, New Jersey

Proceedings of the

American Association of Textile Chemists and Colorists

Copyright, 1955, American Association of Textile Chemists and Colorists

Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

MARCH 14, 1955

AATCC CALENDAR

(A general calendar of events may be found on page 208)

COUNCIL
Apr 29 (Hotel Dennis, Atlantic City, N J); June 17; Wednesday evening, Sept. 21 (Chalfonte-Haddon Hall, Atlantic City, N J); Nov 18; Jan 20, 1956; Apr 20, 1956; June 15, 1956.

NATIONAL CONVENTIONS
Sept. 22-24, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J; 1956 (Waldorf-Astoria, New York); 1957 (Boston); 1958 (Chicago); 1959 (Washington, DC—tentative).

HUDSON-MOHAWK SECTION
Apr 15 (Jack's Restaurant, Albany, N Y); May 20 (Ladies Night); June 24 (Annual Outing).

MID-WEST SECTION
Apr 16 (Netherlands Plaza, Cincinnati, O); June 11 (Annual Outing—Lake Lawn Lodge, Delavan, Wis).

NIAGARA FRONTIER SECTION
April 22 (Buffalo); June 24 (Outing).

NEW YORK SECTION
March 18, April 22, May 20 (Kohler's Swiss Chalet, Rochelle Park, N J).

NORTHERN NEW ENGLAND SECTION
Apr 22; June 10 (Annual Outing); Oct 14; Dec 9.

PHILADELPHIA SECTION
Apr 15 (Kugler's Restaurant, Philadelphia); May 20 (Outing———Manufacturer's Golf & Country Club, Oreland, Pa); Oct 21 (Penn-Sherwood Hotel); Dec 2. Jan 13 (Kugler's Restaurant).

PIEDMONT SECTION
Apr 30 (Robert E Lee Hotel, Winston-Salem, N C); June 10-11 (Mayview Manor, Blowing Rock, N C); Oct 29 (Hotel Wm R Barringer, Charlotte, N C).

SOUTH CENTRAL SECTION
May 14 (Hotel Patten, Chattanooga, Tenn); July 29-30 (Lookout Mtn Hotel, Chattanooga, Tenn — pending); Dec 10 (Hotel Patten, Chattanooga, Tenn).

SOUTHEASTERN SECTION
Apr 23 (American Legion Club, Lindale, Ga); June 3-4 (Annual Outing, Radium Springs, Ga); Sept 10 (Ralston Hotel, Columbus, Ga); Dec 3 (Atlanta Biltmore, Atlanta, Ga).

WASHINGTON SECTION
May 20.

WESTERN NEW ENGLAND SECTION
Mar 18 (Rapp's Restaurant, Shelton, Conn); May 13 (Ladies Night); June 17 (Annual Outing); Sept 16 (Rapp's); Nov 4 (Hartford, Conn); Dec 16 (Rapp's).

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Post Office Box 28, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

55-5

Education: S M, textile technology; S B, business & engr administration.

Experience: 1st Lt, U S Army, chief test officer, QM Corps test team; textile technologist; production expeditor.

Age: 25; married; available about April 1; position as executive asst or project engr desired; N Y area preferred but not essential.

2-28, 3-14

55-6

Education: B S, textile chemistry, with additional courses in textile testing.

Experience: chief chemist & dyer, wool & synthetics.

Age: 50; married; references; New England preferred but not essential.

2-28, 3-14

55-7

Education: SM, polymer chemistry, specializing on fibers.

Experience: research and development, industrial and presently in US Army.

Age: 27; single; references; position as development or research chemist desired, available in May; any location.

3-14, 3-28

Buttons bearing the insignia of the AATCC are available from the Secretary at a new price of $2.25. Pins, with safety clasp, are also available at $2.50 each. Write directly to H C Chapin, AATCC Secretary, Post Office Box 28, Lowell, Mass.

ACTIVITIES OF THE LOCAL SECTIONS

HUDSON-MOHAWK———Fifty members attended the meeting of the Hudson-Mohawk Section which was held at Jack's Restaurant, Albany, N Y, on February 25th.

George L Baxter, AATCC vice president (Central Atlantic Region), gave a brief report on the activities of the national organization with special reference to the local group participating in the work of the research committees and the corporate membership drive.

Sivert N Glarum, Ciba Co, Inc, presented a paper on "Optical Bleaching—White Magic", and also showed a colored film on the application of premetalized dyes on wool and nylon.

* * * * *

NEW YORK———Approximately 200 members and guests attended the February 25th meeting of the New York Section at the Hotel Statler, New York, N Y. An informal dinner preceded the meeting.

Chairman John H Hennessey introduced AATCC president Raymond W Jacoby, who referred to the Perkin Centennial celebration to be held in New York in 1956, and Robert W Brewer, outing chairman, who discussed plans for the event to be held on June 17th at he North Jersey Country Club, Wayne, N J.

The technical program consisted of a panel discussion on dyeing and finishing, with Donald E Marnon, American Aniline Products, Inc, acting as panel moderator. Panelists included Paul J Choquette, General Dyestuff Co; John A Komninos, Waldrich Co; Harry Moore, Fair Lawn Finishing Co; James H Murray, Consolidated Bleaching Co; and Fred Fordemwalt, American Cyanamid Co.

* * * * *

RHODE ISLAND———At the February 24th meeting of the Rhode Island Section, held at the Narragansett Hotel, Providence, R I, John P Cleaver, director of management services, Walter V Clarke Associates, Inc, spoke on "Understanding the Man in the Textile Industry".

There were approximately 125 members and guests in attendance.

AATCC Administrative Newsletter No. 2

NEWS FROM THE TOP

The President's Advisory Committee, having made several recommendations to Council at the January 21st meeting (see minutes on page P164), is now turning its attention to additional problems which confront the administration.

These include:

Publicity to Other Trade Groups—It has been suggested that AATCC expand its activities in advising other professional societies of its work. Benefits to be derived from this are exemplified in the make-up of the General Committee of the Perkin Centennial, which comprises delegates of twenty-seven societies. The official publications of each will give full publicity to the Centennial.

Younger Members More Active—This must be stressed constantly. Much will depend upon the individual sections, but the fact that it is desired must be continuously emphasized, and the means provided for such people to make their desires known. Undoubtedly, many lights are "hidden under a bushel", and many may be reticent about coming forward and offering their services. The Committee will consider what steps can be taken to provide the encouragement and ways and means of accomplishment.

Closer Relations with Other Professional and Trade Groups—The advantages of holding regular meetings with representatives of other groups are obvious, and the advisability of holding a symposium where various representatives may express the aims, accomplishments, and viewpoints of their organizations is under consideration.

Technical Program Committee to Function More Widely—The possibilities of expanding the functions of the National Technical Program Committee, without intruding on the various Sectional Program Committees, include the formation of a central "clearing-house", where Sections needing speakers could obtaind help, or where companies or individuals desiring to present papers can express those desires. Presently the function of the National Technical Program Committee is limited to planning the program for the National Convention.

Honorary Members—The Committee is studying the course of future policy in regard to the appointment of Honorary Members. This select group now numbers four men—Walter E Hadley, Hugh Christison, William R Moorhouse, and William H Cady.

CONSTITUTION AND BY-LAWS

The President's Advisory Committee and the Committee on Constitution and Bylaws have been asked to comment on two suggestions made by Dr Harold C Chapin, AATCC Secretary.

1) At its last meeting the Council requested the Committee on Constitution and Bylaws to draw an amendment to the Bylaws which would embody recommendations of the President's Advisory Committee regarding new duties for our vice presidents. Dr Chapin suggests that the following seems to define the new duties specifically assigned:

Proposed new Section 3, in Article III of the Bylaws, with renumbering of subsequent sections—

"Besides such duties as may be assigned under Section 2, each Vice President shall be a Vice Chairman of the Corporate Membership Committee and a member of the Committee on Membership and Local Sections. He shall report at each Council meeting on activities of his Region."

2) To clarify the clause regarding indebtedness of reinstated members as well as to make the rule conform with new duties, Dr Chapin has suggested the following to replace the last sentence of Section 6, Article II of the Bylaws—

"To discharge indebtedness for unpaid dues of a previous year, a member reinstated before May 1st shall pay two dollars in addition to regular dues for the year of reinstatement. After May 1st the discharge of such indebtedness plus dues for the remainder of that year shall be $8.00 for Senior or Associate membership, $5.00 for Junior, or $3.50 for Student.

A member who resigned in good standing may be reinstated with same dues privileges as a new member."

The second proposal will be considered in relation to present dues, $10.00 for Senior or Associate, $5.00 for Junior and $3.50 for Student member; also prices to nonmembers of Reporter subscription in U S , $7.50; Year Book, $6.00. A new member receives the next book through membership, but may buy the current book for $4.00. He is entitled to credit toward dues of the next year following, according to Section 4 of the same Article II.

PRESIDENT'S MESSAGE TO COUNCIL— JANUARY 21, 1955

IN ASSUMING the duties of this office, I want to acknowledge my sincere appreciation of the very high honor which you have bestowed upon me. I also want to state that I fully realize the great responsibility which will be mine.

I would like to take this opportunity to express publicly my deep debt of gratitude to our retiring president, Bob Bonnar, who gave very unselfishly of his time and knowledge to brief me for this office.

While I do not want to "steal the thunder" from some of those from whom you will hear later this morning, I would like to express some personal opinions.

While acknowledging the responsibility which I have, I feel that all of you, also, have considerable responsibilities. You are members of the governing body of our Association. You are representatives of the various sections, and, as such, are intermediaries between them and the national body. As I get around to the various sections, one complaint often heard is to the effect that the members do not receive enough information about the functioning of the association. The Research Newsletter now appearing regularly in the *American Dyestuff Reporter* keeps the members informed regarding this branch of our activities. As to the proceedings of the Council, while the minutes of the meetings are published in the *American Dyestuff Reporter*, it is usually at least a couple of months after the meeting, and also, it is questionable how many of the members read them. One additional point to consider is that the minutes, of necessity, are factual. While they record all official actions taken, they do not give details as to the discussions or points considered in arriving at such actions. If all of this information was included in the minutes, it would assume the aspect of the *Congressional Record*. Consequently, a mere reading of the minutes may not give the reader the entire picture. You men become familiar with all of this first hand. You could report the Council meetings to your sections in an interesting way which would be more informative than factual recording. Also, you could answer questions, enter into discussions and give your members a much better understanding. I do not know how your various sections function in this regard, but some of them follow the standard practice of having a councilor report at the next meeting after each Council meeting.

Not only do all of you men as councilors have responsibilities, but all of our members do also. Our Bylaws clearly define our position on some items, but, unfortunately, at times this is not clearly understood. We have developed to the position where we are looked to by all sections of the textile industry as well as by other professional societies. Article XIII Section 2 of our Bylaws reads "————no one is authorized to endorse any specification or legislation in the name of the Associations or any of its Committees————". In my work with the ECR under Leonard Little and TCR under Charles Dorn, it has always been evident that they are keenly aware of this regulation, and, in turn, see that the members of their committees are fully informed. In spite of this, misunderstandings have existed. This occurred in some instances where people were considering the activities of the Federal Trade Commission in regard to consumer labelling and the Flammability Act. As soon as these misunderstandings were known to exist, the situation was immediately clarified. However, it is the responsibility of every member to know exactly what our position is, and try to prevent any misunderstandings.

Just one thing more. In traveling around, I occasionally hear grumblings. Maybe this is always to be expected. They have been due to misunderstanding, lack of understanding, and occasionally for valid reason. Personally, I am a great believer in "states rights", but we must never lose sight of the fact that we are a national organization, striving for one goal—the betterment of the industry.

I do not know how many of you heard or read President Eisenhower's recent State of the Union Message. There were a few words in it which I would like to adopt and apply to our Association—"Let us move forward without regard to self or section".

R W JACOBY

MEMBERSHIP APPLICATIONS

February 25, 1955

SENIOR

Leonard M Brown — Dyer & bleacher, Tenn-Rock Hosiery Mills, McMinnville, Tenn. Section: (SCL). Sponsors: M S McNab, D Waller.

Jerry Conn — Owner & Dyer, Allen Dye Co, Chicago, Ill. Section: (MW). Sponsors: E Hoffman, W B Broadbent.

Albert Guriel — Dyer, Waldes Kohinoor Inc, Long Island City, N Y. Section: (NY). Sponsors: R C Allison, C M Mueller.

Norman R Hall — Shift Overseer, Dan River Mills Inc, Danville, Va. Section: (PIED). Sponsors: W E McMann, D W Young, Jr.

Pedrani Franco — Chemist, Director of Dyeing Dept, S A Cotonificio Cederna Milan, Milan, Italy.

Peter V Ricciardi — Demonstrator, E I du Pont de Nemours & Co, Inc, New York, N Y. Section: (NY). Sponsors: L J Roos, B F Quigley.

Edmund M Taft — Asst supt, The Falls Co, Norwich, Conn. Section: (RI). Sponsors: E C Collins, H F Weidman.

JUNIOR

Charles W Braswell — Textile chemist, Standard Knitting Mill, Inc, Knoxville, Tenn. Section: (SCL). Sponsors: R H Baker, Jr, J H Troutman.

Frank A Hirsch — Tech sales, textile industry, Procter & Gamble Distributing Co, Cincinnati, O. Section: (SCL). Sponsors: A W Lanner, B A Ryberg.

Bob E Nagel — Assistant chemist, Standard-Coosa-Thatcher Co, Rossville, Ga. Section: (SCL). Sponsors: W H Bass, Jr, J C Whitt.

ASSOCIATE

Marilyn K Chevli — Free lance textile designer, Minot, Mass. Section: (RI).

Wilfrid E Emond — Assistant dyer, Premier Thread Co, Central Falls, R I. Section: (RI).

Bernard L Schroder—Tech repr, Union Carbide Europa, S A, Geneva, Switzerland.

Geoffrey R Wood — Textile develop engineer, Pacific Mills, New York, N Y. Section: (NY).

STUDENT

Padamshi K Chheda — Lowell Tech Inst. Sponsor: G R Griffin.

William H Pedrick — Lowell Tech Inst. Sponsor: G R Griffin.

Raymond B Allen, Jr — Rhode Island School of Design. Sponsor: H B Sturtevant.

Paul S Bookbinder — Rhode Island School of Design. Sponsor: H B Sturtevant.

Edward W Costa — Rhode Island School of Design. Sponsor: H B Sturtevant.

Herbert J Riley — Rhode Island School of Design. Sponsor: H B Sturtevant.

Gerald M Brown — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Lincoln L Bryant — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Dennis E Dorsey — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Bernard A Dube — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Robert H Gendreau — Bradford Durfee Technical Institute. Sponsor: J Wattes.

William S Hart — Bradford Durfee Technical Institute. Sponsor: J Wattes.

James W Hornby — Bradford Durfee Technical Institute. Sponsor: J Wattes.

John J Hrinko — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Louis B Martins — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Paul F McCann — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Paul E Norton — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Richard Oliveira — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Richard T Oliveira — Bradford Durfee Technical Institute. Sponsor: J Wattes.

William Perry — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Walter F Ritz — Bradford Durfee Technical Institute. Sponsor: J Wattes.

George R Schmoke, Jr — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Franklyn V Shea — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Lawrence F Simard — Bradford Durfee Technical Institute. Sponsor: J Wattes.

Joseph Tavares — Bradford Durfee Technical Institute. Sponsor: J Wattes.

APPLICATION FOR TRANSFER TO SENIOR MEMBERSHIP

Meredith W Chappell Alan Ginsburg
Leo J Clark Ludwig Rebenfeld

Minutes——

One Hundred and Ninety-Fifth Meeting

COUNCIL

THE Council held its 195th meeting in the Hotel Statler, New York, N Y on Friday morning, January 21, 1955. Present were President Raymond W Jacoby, presiding; George L Baxter, Joseph H Jones, George O Linberg and Walter M Scott, *Vice Presidents;* Albert E Sampson, *Treasurer;* William D Appel, J Robert Bonnar, Carl Z Draves and P J Wood, *Past Presidents;* Leonard S Little, *Chairman of the Executive Committee on Research;* Ernest B Kaswell and Robert D Robinson representing Northern New England; Edward H Gamble, Thorwald Larson and Edward W Lawrence representing Rhode Island; Robert C Allison, Matthew J Babey, William F Brommelsiek, John H Hennessey, Patrick J Kennedy and James J Marshall representing New York; Albert E Herrmann and Irwin J Smith representing Hudson-Mohawk; J Edward Lynn representing Niagara Frontier; Carleton T Anderson, Arthur W Etchells, Richard A Shimp, Percival Theel, Frederick V Traut, and Jackson A Woodruff representing Philadelphia; Raphael E Rupp and R Hobart Souther representing Piedmont; William B Griffin representing Southeastern; Joseph D Mosheim representing South Central; Eric W Camp, Samuel Klein and L B MacFarland representing Mid-West; Hubert A Desmarais representing Pacific Northwest; Charles W Dorn of the Technical Committee on Research; James A Doyle of the Publicity Committee; William A Holst of the Committee on Constitution and Bylaws; Albert E Johnson of the Corporate Membership Committee; Arthur I Hultberg, chairman of the Mid-West Section; Charles A Whitehead; and Harold C Chapin and Richard R Frey of the secretary's office.

Following the remarks of President Jacoby in assuming the duties of the office, the Secretary's report of the 194th Council meeting and financial report of December 31 and the Treasurer's report of January 7 were accepted. (A full text of Mr Jacoby's remarks appears on page P163 of this issue).

Committees were appointed, or stand, as follows—

Executive Committee on Research

L S Little, *Chairman*
C W Dorn, *Vice Chairman*

J R Bonnar	E W Lawrence
W A Holst	E A Leonard
R W Jacoby	C A Sylvester
H Y Jennings	J A Woodruff

Technical Committee on Research

C W Dorn, *Chairman*
C A Sylvester, *Vice Chairman*
Other members as presently listed.

Publicity

J A Doyle, *Chairman*
T R Scanlan, Jr, *Vice Chairman*

R V Dugdale	A E Johnson
J C Fonville	D S Lyle
R R Frey	T M Marshall
M R Hallinan	J J McGuinness
A N Henschel	N W C Pratt
K L Howry	J O Sweitzer

A R Thompson

Appropriations

A E Sampson, *Chairman*

H C Chapin	T R Smith
C Z Draves	P J Wood

Membership and Local Sections

G L Baxter, *Chairman*

G O Linberg	J H Jones
H C Chapin	W M Scott

Publications

P Theel, *Chairman*
N A Johnson, *Secretary*
C Z Draves, *Editor of Proceedings*
W H Cady, *Editor, Technical Manual and Year Book*

J R Bonnar	R W Jacoby
H C Chapin	H Y Jennings
J A Doyle	P J Luck
W A Holst	C A Whitehead

Corporate Membership

A E Johnson, *Chairman*
Other members appointed in cooperation with local sections.

Constitution and Bylaws

H C Chapin, *Chairman*

W A Holst	P Theel

Technical Supplies

H C Chapin, *Chairman*

R W Jacoby	A E Sampson
L S Little	H W Stiegler

Conventions

G O Linberg, *Chairman*
R R Frey, *Secretary*

S L Hayes, 1 yr	W F Fancourt, 3 yrs
P J Kennedy, 1 yr	C R Gill, 3 yrs
E W Camp, 2 yrs	A I Hultberg, 4 yrs
R W Jacoby, 2 yrs	E R Kaswell, 4 yrs

Technical Program

A W Etchells, *Chairman*
Others to be appointed later.

Perkin Centennial

R W Jacoby, *Chairman*
R R Frey, *Secretary*
E A Leonard, *Vice Chairman*
H F Herrmann, *Treasurer*

W D Appel	P J Kennedy
K H Barnard	G O Linberg
G L Baxter	D E Marnon
J R Bonnar	G Meynell
A G Bruinier, Jr	W G Parks
M A Dahlen	A E Sampson
H E Hager	W M Scott
R J Hamilton	C A Whitehead
S L Hayes	H L Young

Colour Index Editing

W H Cady, *Chairman*
W A Holst, *Secretary*

W D Appel	R W Jacoby
J R Bonnar	W W Carr

C A Sylvester

Colour Index Marketing

A E Sampson, *Chairman*
H C Chapin, *Secretary*

W H Cady	G D Jackson, Jr
J A Doyle	R W Jacoby
C W Dorn	P Theel

President's Advisory Committee

J R Bonnar, *Chairman*
C A Whitehead, *Secretary*

G L Baxter	G O Linberg
H C Chapin	C N Rabold
H F Herrmann	A E Sampson
N A Johnson	W M Scott
J H Jones	T R Smith

For the President's Advisory Committee, Mr Bonnar reported as follows:

I. The President's Advisory Committee, formed at request of the president to review certain projects or propositions with idea of studying the pros and cons before Council meeting, and thus be able to discuss in concentrated and well-thought-out manner to save time of Council and give background for decision by Council, will, it is hoped, guard against snap decisions and lengthy discussions. This committee will not work out details nor in any way usurp or infringe on power of committees or Council, but will, when it sees fit,

make suggestions and, at times, recommendations to the president.

II. First meeting held Thursday, January 20, 1955.

III. *Duties of Vice Presidents:*

A. Be active in assisting sections to operate in best manner possible.

1. Endeavor to get councilors to report to sections on Council activities.

2. Endeavor to get sections to hold meetings of sectional committees, etc.

B. Assist through personal contact and specific requests to section officers to make available names of qualified personnel for committees both national and sectional.

C. Assist National Corporate Membership Committee chairmen in corporate membership drive. This could perhaps be worked out by the vice presidents being made vice chairmen of National Corporate Membership Committee for their own regions.

D. Vice presidents should be expected to report to Council on overall activity in the regions, not in detail by sections, however, as this is duty of councilors.

E. Vice presidents should request secretary of each section in their region to be placed on mailing list for notices of meetings.

The President's Advisory Committee strongly feels that action along the lines above will not only help mold a better Association but will give vice presidents a feeling of usefulness and, at the same time, give a good training for eventual presidential timber.

IV: *Student Chapter Intersectional Contest:*

It would seem for many evident reasons that contests of students should be started again. The project previously failed because our rules concerning eligibility did not coincide with rules of certain schools involved.

It is therefore the thought of the committee that:

A. Name be changed to Student Inter-Regional Contest.

B. In cooperation with school administrators that new rules be set up.

C. Serious consideration be given to not limiting this contest to schools having student chapters.

V. *Allowance to Sections:*

Under Article X, Section 4, of the Bylaws, each section is allowed up to 35 cents per member for expenses incurred, $25.00 per meeting for speakers and equipment with a maximum of $1.00 per member, per year. Should the 35 cents be doubled, for instance, this would help the larger sections but not the smaller sections and thus defeat the purpose.

Recognizing the present hardship, and yet not desiring to have the national treasury support sections, it is recommended that the proposal be submitted either to a special committee, or the Appropriations Committee, for study.

VI. *Career in Textile Industry:*

It is felt that the textile industry is not obtaining its rightful share of the all too small number of technically trained men coming from institutions of learning, with technical developments in the textile industry thus at stake.

The President's Advisory Committee thus suggests that:

A. The Publications Committee survey the possibility of bringing out a brochure to enlighten the students as to the romance and possibilities in the textile industry.

B. Should they do this, that it be done after consulting with other committees and groups interested in the same project, for instance, the Association of Textile School Deans.

This report was approved and made a part of the minutes of the meeting. The vice presidents were asked to serve as indicated, pending revision of the Bylaws on their duties. The Committee on Appropriations was asked to consider and report on that portion of Article X, Section 4, of the Bylaws concerning reimbursements to sections for expenses. The president was authorized to appoint a Committee on Student Contest, and a committee to consider both the publication of a brochure for prospective students on the textile-wet-finishing industry and provision of speakers for student groups.

Mr Little reported that Frank J Rizzo, who had been cooperating with facilities of the Quartermaster Laboratories in preparation of new light fastness standards, would hereafter be a member of the Technical Committee on Research. It was hoped that fabrics tested in end use would become available from several sources for comparison with Association tests. Monthly reports would hereafter be received from Mr Seibert on his light-fading experiments. The committee working in the ISO on shrinkage is still active. Under Mr Sylvester a committee is being organized to cooperate with medical authorities on dermatitis tests. Plans are underway for exposure of fabrics in the next atomic bomb tests. Further refinement of the Accelerotor and its uses in progress at Lowell. Albert Johnson presented in final form, and received approval of, the new Corporate Membership application form, for immediate printing.

Mr Sampson reported for the Committees on Appropriations and Colour Index Marketing, requesting and receiving approval of certain redistributions of stock holdings, and investment of $25,000 in short term obligations or savings banks while awaiting uses for which appropriated.

For the Publicity Committee Mr Doyle reported a news release to various publications on the new officers of the Association, but principal effort on organization of the Committee and plans for 1955. Special effort is being made to interest local sections in the collection and dissemination of news.

Professor Theel reported a few criticisms of the small type first used for the membership list in the *1954 Year Book*. In view of the considerable expense and labor expended in this effort to keep the book within usable dimensions, the Publications Committee has decided to retain the small type in the 1955 volume. Companies expecting to have their dyes and other chemical products listed in this year's book have been requested to keep Mr Cady advised of their manufacture in this country. A subcommittee on rules of eligibility for such listing is to be appointed. In designation of dyes which are not mixtures, the term "straight" will be substituted for "homogeneous." Of the papers on stream pollution, the "Waste Guide" was about ready for distribution, and would be reprinted in the *Reporter*.

Mr Linberg reported that a special committee had been appointed to concentrate on that part of the Perkin Centennial program assigned specifically to the Association. Approval was voted for a Convention of 1958 in the Hotel Conrad Hilton, Chicago, under auspices of the Western Region. An invitation from the Washington Section for 1959 was referred back to the Section with thanks and the request that the entire Southern Region be designated the host. Mr Jacoby reported the appointment of Edmund A Leonard as vice chairman of the Perkin Centennial Committee.

The following Council meeting dates were approved —

April 29, 1955	Jan 20, 1956
June 17, 1955	April 20, 1956
Sept 21, 1955	June 15, 1956
Nov 18, 1955	

The meeting of September 21, 1955 will be on Wednesday evening, at the Atlantic City convention.

Presented by Mr Baxter for the Committee on Membership and Local Sections, each of the following was elected to the class of membership specified:

(Concluded on Page P167)

Minutes——

One Hundred and Eighty-Second Meeting

TECHNICAL COMMITTEE ON RESEARCH

THE 182nd meeting of the Technical Committee on Research was held on Friday afternoon, January 21, 1955 at the Hotel Statler, New York, N Y.

Those in attendance were: — C W Dorn, chairman; C A Sylvester, vice-chairman; L S Little, chairman, Executive Committee on Research; H W Stiegler, director of research; M J Babey, secretary; and R C Allison, E C Atwell, G L Baxter, J N Dalton, H C Donaldson, J A Doyle, A W Etchells, E Freedman, P J Fynn, S N Glarum, W B Griffin, E Hansen, A N Henschel, A E Herrmann, A E Hirst, W A Holst, R W Jacoby, E R Kaswell, S J Kennedy, W Klaas, J Kreue, E W Lawrence, A E Leonard, G O Linberg, J E Meili, J E Norton, A D Nute, F J O'Neil, F J Rizzo, R D Robinson, R E Rupp, V S Salvin, C H A Schmitt, W M Scott, R B Smith, H R Souther, C A Sylvester, A F Tesi, and P J Wood.

Chairman Dorn opened the meeting by asking President R W Jacoby to say a few words. Mr Jacoby congratulated the Committee on its good work in the past and expressed the hope that it would continue to do the same in the future. Also presented to the Committee were Matthew J Babey, the new TCR secretary, and James A Doyle, national publicity chairman.

ECR chairman Little briefly discussed what AATCC can do to set up its test methods to lend them more efficiently to end usage. He made it clear that AATCC is not trying to set up standards, but is trying to have its test methods better applied to the needs of industry for determining end usage. He asked for suggestions from the floor, and, following considerable discussion, the formation of a subcommittee to explore the possibilities of such a program was approved.

Harold Stiegler, AATCC director of research, reported that all subcommittees of TCR as well as the permanent research staff at Lowell have been kept very busy. He noted especially that Charles Seibert has been working on several problems on light fastness, and he also called attention to the fact that the best definitions compiled by George Hotte of the Committee on Definitions have been circulated for comments but not for a vote.

Highlights from the reports of subcommittee chairmen or representatives follow:

Antistatic Finishes ——— Chairman Glarum reported that his committee would investigate charge generation on fabrics.

Evaluation of Fire-Resistant Textiles ———Dr Stiegler, reporting for J R Redmond, announced that four cotton fabrics which were fire-resistant processed in three different plants had been tested by the committee, using the newly constructed testing cabinets. The correlation between the three laboratories proved to be the best obtained by the committee. Some minor changes in the testing cabinet will be required before the committee concludes its standardization work.

Committee on Washing ——— Chairman Fynn asked the committee to adopt the Accelerated Wash Tests #2A, 3A, 4A as standard test methods. The committee so approved. Mr Fynn outlined some of the future work regarding the Alternate Light and Wash Test. He also reported that Colgate-Palmolive Co has been contacted to supply a known built detergent with and without fluorescent material. This would be used in the survey to see what effect detergents have in rating washing as compared with soap.

A discussion followed as to the interpretation of the 2A Test. It was agreed to change the wording in the *Year Book* referring the 2A Test to all fibers and also to machine laundering.

Committee on Fastness to Light ——— Chairman Allison asked F Rizzo to report on status of Blue Standards. Mr Rizzo outlined the past and present work done in dyeing of Wool Blue Standards for light. He also reported on the Fade-Ometer and sunlight exposures on the new set of Blue Standards. All of the exposures show that the new set fades faster than the old. The Azurole primary seems to be satisfactory but the Algosol is slightly thin, and, therefore, this may be causing the standards to fade faster. It was agreed to correct the Algosol and then make a new blanket of the standards for checking. Mr Rizzo stated that, if all goes well, the standards should be ready by May 1st.

Mr Allison reported that a report is being prepared on the correlation of sunlight and Fade-Ometer on Wool Blue Standards only.

A program is being set up for checking the Automotive Sun Test. Exposures will be made in Arizona, Florida and at Mr Seibert's home in Salem, N J.

Water Absorbency — Chairman Smith reported that the wire-screen method gives the best uniform and correlating results.

Atmospheric Fading — Chairman Salvin asked that this committee be known as the Committee on Fading of Dyed Textiles Due to Atmospheric Contaminates. The request was approved. He reported that the committee has approved the Cliffside Dyeing Unit and the U S Testing Vertical Gas Fading Test Chamber especially for quick testing where results can be made in two to three hours. Considerable work has been done using the U S Testing Vertical Rotating Chamber wherein the combustion gases from the gas burner are enriched by oxides of nitrogen generated by the action of phosphoric acid on an aqueous solution of sodium nitrite. Although in most cases the results were satisfactory, this procedure is not recommended where results of a quantitative and judicious nature are desired since duplication of the amount and direction of fading can only be obtained by very careful control.

Continuous Wool Scouring Processes ———Chairman Leonard reported that the committee has progressed a long way in the solution of fugitive light shades on wool due to contamination by "fadeable dirt" of the wool substrate. It was determined that the substrate in some cases contained an alcohol-soluble yellow-green fraction, which was extremely fugitive to light, fading out completely in one-half hour to one hour Fade-Ometer exposure. The resulting effect on dyed shades was to produce an apparent fade in the direction of increased redness and blueness.

The incidence of the problem was associated with heavy dung contamination of the grease wool. Alcohol extraction of this contamination revealed the presence of the yellow-green fadeable component, and a test method for alcohol extraction

and quantitative determination on the spectrophotometer was developed.

The committee has concentrated on methods for better cleansing of the wool to remove the danger of this fadeable dirt contamination. The conclusions reached are:

1) That increased mechanical processing of the wool before scouring is very beneficial. The more dusting out of dry dirt which can be done before scouring the raw wool, the better removal.
2) In cases of heavy contamination, as illustrated by a wool type known as "Texas Tags", a considerable amount will still persist after repeated dustings. Various wet processes, such as alkaline and acid treatment, oxidizing and reducing treatments, etc, show that the cheapest and best commercial treatment is carbonizing followed by sodium bisulfite reduction.

The committee is greatly indebted to Henry Millson and Elmer Glaeser of American Cyanamid Company's Dyestuff Department for a very detailed laboratory study, which shed further light on the nature and properties of the fadeable dirt component in sheep dung. It had previously been thought that the yellow-green color was associated with chlorophyll, a component of the main food of sheep. The American Cyanamid study revealed that chlorophyll cannot persist undigested when grass is eaten by sheep and it was determined that the fadeable dirt component is probably the coloring pigment of bile. Library research revealed that bile pigments are alcohol-soluble and of a color similar to that which has been causing this fadeable condition on light wool shades. Samples of bile are being collected for analysis, which should complete the work on this project.

There being no further new business, the meeting adjourned.

The next meeting of TCR will be held in Atlantic City, N J, on April 29, 1955 at the Hotel Dennis.

Respectfully submitted,
MATTHEW J BABEY
Secretary

195th Council Meeting—

(Concluded from Page P165)

CORPORATE

Moreland Chemical Company
Para-Chem, Inc
A E Staley Manufacturing Co

SENIOR

S Aronoff
V L Avery
B R Desai
V Bottelli
E W Bronke
W Brunner
S F Bryan
J E Burns
H R Bylsma
J T Castles
F Castorino
H J Chu
J E Clark
J M Collins
A R Cripps
W J Cunningham
C B Darsey
I P Davis
T J Doheny
W N Dow
H W Emhart
S J Fantl
E Franck
J V Gallagher
S Garland
S M Gates
J W Gilkey
J E Greene
R H Griesser
E Gudgeon
H W Guenther
W J Gruzdis
E W Hendrix
W B Huskey
H Idogaki
M Joseph
E F Kappel
G E Lindner
R W Loh
R P Manasse
E M Marcin
J H Mathewson
E B Menhofer
E Mishaan
W J Myers
J J Nihill
J Nunnikhoven
J J O'Neil, Jr
C J Papini
L H Perry
O Poltersdorf
E C Rice
E W Sack
L C Shive, Jr
W B Silver
A C Sizemore
R E Tanasoca
D S Threlkeld
J Varcadipane
G H Walker
M Wegmann
D T Wilkinson
T T Wroble

JUNIOR

D L Campbell
J Y Papineau
V L Readling
D A Ruggiero, Jr
W Tannenbaum
R C Wagman
J M Weisman

ASSOCIATE

R R Blue
W H Byles
J A Conner
D W Kallman
H Kfare
F P Mackinney
D L Masland
R J Meyer
A H Miller
K Murakami
E C Orbea
R Rieg
W B Shea
J C Wilkes
A J Williams
B A G Winberg

STUDENT

F Blais
W H Brehm II
J M Buckner, Jr
R V Clarke, Jr
D F Crean
J E Farrington
C A Flowers
C Garrett
D A Haddock
A I Hauser
D H Helms
J H Howell
G E Lanciault
J B Smith
A T Taylor, Jr
J A Warden
R E Weisheit
A A Wojtowicz

TRANSFERRED FROM OTHER CLASSIFICATIONS TO SENIOR

N H Berland
T F Cole
M A DaSilva
J A Davis
F L Dennett
J A Doyle
H S Ehrhardt
J L Gerhard, Jr
E M Haddad
C P Yih
J L Heaton
D H Hellman
E G Mercer
R E Newman
C R Pinucci
G V Raso
V C Smith
D T Thompson
W C Walter, Jr

Respectfully submitted,
H C CHAPIN
Secretary

SECRETARY'S FINANCIAL REPORT—DECEMBER 31, 1954

	Applications	*Dues regular & reinstate*	*Dues Corporate & Sustaining*	*Miscellaneous*	*Totals*
Received & transmitted to Treasurer, August 1 to October 28, 1954	1549.00	23118.50	980.00	7656.61	33304.11
October 28 to December 31	1009.00	25345.00	27590.00	2222.34*	56166.34
Total in fiscal year to December 31	2558.00	48463.50	28570.00	9878.95	89470.45
Leaving deposited by Treasurer with Secretary,					3314.24
For comparison, receipts to December 1, 1953	2296.50	37759.50	29605.00	18255.52	87916.52

* Miscellaneous items,

Reporters & reprints,	15.10
Drycleaning kit,	.50
Year Books	975.25
Crockmeters	553.26
Crock cloth	1.65
Water test apparatus	37.20
Dyed standards	52.00
Knitted tubing	10.40
Gas fading units	2.00
Buttons	4.75
Color transfer charts	106.73
Fire resistance blue prints	2.00
Analytical methods	22.00
Application of Vat Dyes	264.90
Standard grease wool	4.50
Accelerotor royalties,	158.10
Grey scales	12.00
	2222.34

H C CHAPIN,
Secretary

BIBLIOGRAPHY ON TEXTILE WASTE

Compiled by

STREAM-SANITATION COMMITTEE

of

PIEDMONT SECTION

HOBART SOUTHER, *Chairman*
T A ALSPAUGH
R C DAVIS
J L JAMES
A L SMITH
DUANE W SNYDER
WILLIAM THOMPSON
VINCENT B WRIGHT

One of the activities considered by the AATCC National Stream Pollution Committee to be of great immediate value was the preparation of a bibliography on past and current research and on methods of textile waste treatment. The field of textile waste study is so relatively new that the collection of available but scattered information was deemed a necessary first step to organized progress.

To that end, the Piedmont Section's Stream-Sanitation Committee, with the valuable assistance of other local sections and individual members, has compiled a list of references on textile wastes, their analysis, prevention and treatment, for the benefit of the textile industry.

This work is part of a national program and, like that of other sections, has been prepared for and authorized for publication by the National Committee on Stream Pollution, AATCC, of which Prof Percival Theel is Chairman, and Thomas H Hart is secretary.

INDEX TO REFERENCES

Fiber	*Section*	*Reference Number*
Cotton	I A	2, 3, 11
	I B	5, 7, 8
	II A	1, 6, 10
	III A	3, 12, 15, 18, 19, 21, 27, 29, 37, 47, 48, 53, 54, 61, 62, 63, 65, 68, 70, 76, 78, 87, 89, 95
	III B	6, 9, 20
	VI A	5, 36
Felt	III A	49
	VI A	36
Flax	II A	11
	II B	14, 15
	III A	41, 56, 75, 90
	VI A	30
Hemp	II B	15
	III A	58, 89
Linen	III A	57, 89, 90
Rayon	II B	2, 3, 9
	III A	44, 64, 79, 97
	III B	1, 9
Silk	III A	37, 64, 89
Wool	II A	7
	II B	1, 4, 5, 7, 8, 10, 11, 12, 16, 17, 18, 19, 20
	III A	9, 16, 22, 23, 30, 37, 38, 50, 64, 71, 75, 89, 92, 94
	III B	5, 7, 11, 12, 14, 16, 17, 19, 21
	V A	2
	VI A	9, 36
General	I A	1, 4, 5, 6, 7, 8, 9, 10
	I B	1, 2, 3, 4, 6, 9, 10, 11, 12, 13
	II A	2, 3, 4, 5, 8, 9, 12, 13, 14, 15, 16, 17, 18
	II B	6, 13
	III A	1, 2, 4, 5, 6, 8, 10, 11, 13, 14, 17, 20, 24, 25, 26, 28, 31, 32, 33, 34, 35, 36, 39, 40, 42, 43, 45, 46, 51, 52, 55, 59, 66, 67, 68, 73, 74, 77, 79, 81, 82, 83, 84, 85, 86, 88, 91, 93, 96, 98
	III B	2, 3, 4, 8, 10, 15, 18
	IV	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
	V A	1, 3, 4
	V B	1, 2
	VI A	1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 37, 38

I TEXTILE WASTE PROPERTIES

A Chemical Analysis

(1) "Syndets in Sewage Can Be Measured", Samuel D Faust. *Water Sewage Works* 100, 242-2 (1953).

(Water and Sewage Works, 22 West Maple Street, Chicago 10, Ill.)

The concentration of synthetic detergents of the anionic surface-active type present in sewage can be determined by use of an analytical kit utilizing the methylene blue method. The method is applicable to alkyl sulfates, such as Dreft and DuPont Mp 189; alkyl sulfonates, as Vel and Ultrawet K, DS, and SK Bead; alcohol sulfates, as Sulfonate KAA, DuPont 80 and LS Paste; amine salt alkylarylsulfonate, as Sulfanole KA; alkylarylpolyether sulfate, as Triton 771; and alkylaryl polyether sulfonate, as Triton X-200.

---

(2) "Industrial Waste Surveys of Two New England Cotton Finishing Mills", M Burford, J Masselli, W Snow, H Campbell and F Deluise. Prepared for the New England Interstate Water Pollution Control Commission. (June, 1953).

(73 Tremont Street, Boston 8, Mass.)

The authors of this eighty-two page report have made a very complete study of the waste from each process of the two mills. Tables show the following data: Mineral Acidity, Total Acidity; Hydroxide, Carbonate, and Bicarbonate Alkalinities; Total Volatile, Fixed, and Suspended Solids; Oxygen Consumed and Biochemical Oxygen Demand. A description of each mill process is given and the weight of material processed is tabulated. The survey also embodies a study of the BOD organic compounds used in the mills.

Conclusions indicate that a concentrated effort toward substitution of processing compounds could result in an over-all reduction of pollution of 50 to 70 percent. Since desizing wastes are the major offenders as indicated by the mill study, the authors recommend the investigation of synthetic sizing materials as possible substitutes for starch.

---

(3) "A Survey of Three Textile Mills in Connecticut", M G Burford, Herbert F Berger and Joseph W Masselli. Report to New England Interstate Water Pollution Control Commission (May, 1951).

(73 Tremont Street, Boston 8, Mass.)

A thorough industrial-waste survey of a large cotton finishing mill, a small wool finishing plant and a small bleaching and finishing mill for light cotton and synthetic fabrics is reported. Extensive tables are given showing analyses and flows of the wastes from the various processes. Equalization, neutralization and controlled discharge of the stronger wastes from the cotton finishing mill provide adequate treatment. The BOD of mill wastes may be reduced by substituting certain synthetic detergents for soaps. Results of experiments on the chemical coagulation of wool finishing wastes are given. Treatment of these wastes by anaerobic digestion was only partially successful.

---

(4) "Analysis of Sewage and Trade Effluents", M Lovett and H Fish. *Inst Sewage Purif, J Proc*, 5-15 (1950).

(34 Cardinal's Walk, Hampton-on-Thames, Middlesex, England.)

A astudy of the reagents and analytical procedures required to test for numerous chemical wastes in sewage and industrial effluents.

(5) "Measuring the Strength of Sewage and Trade Wastes, BOD or OC?", R S Ingalls, J C Hildebrand and G M Ridennour. *Water Sewage Works* 97, 21-27 (1950).

(Water and Sewage Works, 22 West Maple Street, Chicago 10, Ill.)

Strength of sewage and trade wastes can best be measured by the oxygen consumed, as indicated by the acid dichromate method, and the BOD. The OC method is rapid, reasonably accurate, free from biological variation interference, gives reproducible results, sometimes loses volatile organic matter, requires corrections for oxidation of chlorides, and includes organic matter not available to bacteria, e g paper. BOD method corresponds to sewage-plant procedure. Disadvantages of BOD method: slow, nitrification may not occur during incubation period, dilution may affect values, proper seeding difficult, and toxic materials affect results.

---

(6) "Textile Waste—A Review 1936-1950", M G Burford, Herbert F Berger and Joseph W Masselli (December 1950).

(New England Interstate Water Pollution Control Commission, Boston 8, Mass.)

Wastes producing processes and the types of wastes obtained in the textile industry are described. The following textile-waste characteristics are described: a) decomposable organic matter, b) acidity and alkalinity, c) suspended solids, d) grease, e) synthetic detergents, f) sulfides, g) color and h) other effects. Several methods for the treatment of various wastes from the textile industry are described, and some consideration is given to the economic feasibility of the treatment process. The report contains a fine bibliography (236 references) on articles published since 1936 relative to textile wastes; and an appendix, containing tabulated waste characteristics and results of treatment, attempts to point out the wide variation that may be found in textile wastes at various plants.

---

(7) "Analysis of Waste Waters—Study of the Oxidizability of Unheated and Heated Water, the Putrescibility, the Biochemical Oxygen Demand", I Beeckmans and P Beaujean. *Bull Centre Belge Etude et Document*, Eaux No. 3, 163-76 (1949).

(2 rue Armand Stevart, Liege, Belgium.)

Data are given on waters from a septic tank, from a tannery, and on the oxygen consumed at temperatures between 30 and 39.6°C. The methods of analysis for oxidizability of temperatures of 18-37°C are summarized in a table, and data are given for the oxidizability of metallurgical, tannery, textile wastes, and for the juice from the anaerobic fermentation of dead leaves. Results are also given on oxidizability at 20 to 30°C after incubation, and the stability as determined by the decolorization of methylene blue was also studied. The methods used for the determination of oxidizability near the boiling point are also reviewed, and some data are given for the oxidizability of a number of organic substances. The method of Palmer as modified by Ellis et al is recommended. It is concluded that the method of Kubel should be used as an orientation test for investigation of dilutions. The dilution should be chosen so that about 50% of the $KMnO_4$ remains after boiling 30 min (about 5 ml for the first trial). There are also some recommendations regarding the concentration of the reagents. 20 references.

(8) "Applicability of Various Methods of pH Determination for Analysis of Industrial Waste Water", A V Evlanova. *Zavodskaya Lab* 5, 1371-2 (1949).

(Metallurgizdat, Isvetnoi Bulvar d 30, Moscow, USSR.)

Suitable methods for determining the pH of various industrial wastes are as follows: Waste water from leather tanning plants: Glass electrode or colorimeter is used with iso-amyl alcohol for color extraction. Textile plant waste liquors: Glass electrode is most satisfactory, hydrogen electrode can be used in the waste liquor from bleaching shops. Paper-cellulose sulfite waste liquors: Glass electrode or colorimeter is used for the concentrated sulfite alkalies; glass electrode, hydrogen electrode, quinhydrone electrode, antimony electrode, or colorimetry is used for the dilute solutions. Electroplating waste: Glass electrode or colorimeter is used. Any method is suitable for petroleum refinery liquors. Gas generation waste liquors: All methods are suitable for liquor (cooled) from the hydraulic locks; only glass electrode and colorimeter are suitable for liquors obtained past the scrubbers.

---

(9) "Bibliography on Water and Sewage Analysis", B H Weil, P E Murray, G W Reed and R S Ingols. Georgia Institute of Technology, State Engineering Experiment Station, Special Report No. 28 (1948).

(Atlanta, Ga.)

A list of over 2,500 references concerning water and sewage analysis.

---

(10) "Determination of BOD Value by Chemical Oxidation", G A Rhame. *Water Sewage Works* 94, No. 5, 192-194 (1947).

(Water and Sewage Works, 22 West Maple Street, Chicago 10, Ill.)

A general discussion of the acid dichromate oxidation method of determining BOD.

---

(11) "Textile-Mill-Wastes Treatment Study". Texas State Department of Health, Bureau of Sanitary Engineering.

(Austin, Texas.)

This report is a series of tables showing the analyses and composition of indigo wastes, wastes from rawstock dyeing, wastes from finishing department, slasher wastes, and a composite table of all wastes and treatments recommended. Included in the report are additional tables showing the relation of volume of wastes to production.

Analyses of wastes include oxygen consumed; alkalinity, as carbonate and bicarbonate; chlorides; solids; color intensity; pH; and temperature.

Studies were made as to possible treatment procedures, including aeration, filtration with various media, chemical precipitation, and oxidation. A table of typical treatment results and expected chemical cost is included in the report.

B Polluting Effects

(1) "Effect of Detergents on Sewage and Water Treatment", Anon, *Chem Eng News* 31, 1072-9 (1953).

(Chemical and Engineering News, American Chemical Society, 1155 16th Street NW, Washington 6, D C.)

Properties of the more important synthetic detergents are reviewed, and future methods of treatment are suggested.

(2) "Effect of Detergents on Sewage Microorganisms", Raymond Manganelli and Edwin S Crosby. *Sewage Ind Wastes* 25, 262-76 (1953).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

1) Slime growths and biological-treatment processes established by autochthonous sewage microorganisms of synthetic detergents in sewage.

2) Low concentration of anionic and nonionic detergents stimulate slime growths; cationic detergents retard it.

3) Anionic and cationic detergents decrease oxidizing, purifying, and nitrifying capacities of activated sludge and cause a general deterioration of its physical and biological properties.

4) Nonionic detergents produce no detrimental effect on activated sludge or its properties.

5) Interaction between anionic and cationic detergents reduces the inhibiting action of these materials on oxidation by activated sludge organisms.

6) Anionic and cationic detergents have a marked detrimental effect on stalked and free-swimming protozoan present in activated sludge.

Nacconol, Ceepryn, and Tween 80 were the detergents used in these tests.

---

(3) "Operating Experiences with Detergents at Washington, D C", Ralph E Fisherman and John E Rice. *Sewage Ind Wastes* 25, 277-83 (1953).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

Changes in the characteristics of sewage during recent years are believed to be caused partly by synthetic detergents. The changes noted are

1) Reduction of per capita BOD of the sewage.

2) Reduction of percent removal of BOD and suspended solids by the primary units, and very little change in the strength of primary effluents as measured by BOD and suspended solids.

---

(4) "Action of Detergents in Sewage Treatment—A Study by Industry", W R Gowdy. *Sewage Ind Wastes* 25, 255-61 (1953).

(Federation of Sewage and Industrial Wastes Association, 325 Illinois Building, Champaign, Ill.)

Conclusion: Frothing was caused by an agent formed in the aeration process rather than by added detergents.

---

(5) "Industrial Waste Surveys of Two New England Cotton Finishing Mills", M Burford, J Masselli, W Snow, H Campbell, F Deluise. Prepared for the New England Interstate Water Pollution Control Commission. (June, 1953.)

(73 Tremont Street, Boston 8, Mass.)

The authors of this eighty-two page report have made a very complete study of the waste from each process of the two mills. Tables show the following data: Mineral Acidity, Total Acidity; Hydroxide, Carbonate, and Bicarbonate Alkalinities; Total, Volatile, Fixed, and Suspended Solids; Oxygen Consumed and Biochemical Oxygen Demand. A description of each mill process is given and the weight of material processed is tabulated. The survey also embodies a study of each organic compound used in the mills with regard to their potential BOD.

Conclusions indicate that a concentrated effort toward substitution of processing compounds could result in an over-all reduction of pollution between 50 to 70 percent. Since desizing wastes are the major offenders as indicated by the mill study, the authors recommend the investigation into synthetic sizing materials as possible substitute for starch.

(6) "Evolution of Surface-Active Agents During Treatment of Effluents", Edwin Leclere and Paul Beaujean. *Industrie Chim Belge* 17, 567-72 (1952).

(Industrie Chim Belge, 32 rue Joseph II, Brussels, Belgium.)

Effluents containing synthetic detergents differ from soap-containing waters in their lack of reaction to calcium and magnesium salts or acid, in low oxidizability, in slower rate of settling of flocs, and in volume of sediments.

---

(7) "Textile Dye Wastes", Nelson L Nemerow. *Chem Age*, June 14, (1952).

(Bouverie House, 154 Fleet Street, London EC4, England.)

The pollutional character of textile dye wastes depends upon the type of dye used, which in turn depends to a great extent upon what kind of cloth is being dyed and the specifications of the finished dyed cloth. The main dyes are 1) direct colors, 2) sulfur colors, 3) vat colors, 4) acid colors, 5) developed colors, 6) naphthol colors, 7) acetate colors. There are at least five ways in which a textile dye waste must be treated before it is discharged into a municipal sewer for further treatment: 1) equalization, 2) neutralization, 3) proportioning the flow to that of domestic sewage, 4) removal of colored matter, and 5) removal of oxygen-chlorine demanding matter.

---

(8) "Waste Disposal in Cotton Textile Industry", E Abram. *J Southern Research* 4, No. 1, 14-16 (1952).

(H McKinley Conway, Jr, Editor and Manager, 5009 Peachtree Rd, Atlanta, Ga)

A good general discussion of pollutions, methods of disposal, and purity tests conducted on wastes from typical southern cotton-processing mills.

---

(9) "Industrial Waste Inventory", S G Hess. Interstate Sanitation Commission Report, (1951).

(New York 7, N Y.)

Three hundred and six industries along New York, New Jersey, and Connecticut shores discharge 515 million gallons of waste per day. Predominant industries are food, textile, chemical, petroleum refineries, metals, and gas refiners and manufacturers. Petroleum refineries amount to 5% of total industries but dump 65% waste. Wastes contain an average of 334,000 lb BOD, 358,000 lb suspended solids, 95,000 lb acid, and 60,000 lb toxic materials (e g, phenols, cyanides, metallic salts), and 101,000 lb grease and oil per day. Only a minimum treatment is provided by 138 plants dumping 433 million gallons/day.

---

(10) "Forum on Industrial Waste Problems", S E Coburn. *Sewage Ind Wastes* 22, 776-806 (1950).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

A general forum on industrial wastes with contributors by numerous industries including textiles.

---

(11) "Synthetic Detergents and Sewage Processing: Part V——Effect of Synthetic Detergents on Certain Water Fauna", P N Degens, H Van Der Zee, J D Kommer and A H Kamphuis. *Inst Sewage Purif, J Proc*, 65-68 (1950).

(34 Cardinals Walk, Hampton-on-Thames, Middlesex, England.)

A general discussion of the effect of synthetic detergents on bacterial life in sewage and industrially polluted streams.

---

(12) "Pollution of the Rio Quilombo", Francisco Bergamin and Jose S Correa. *Boletim De Industria Animal* 11, 137-43 (1950).

(Ave Francisco Metarazzo N 455, Caixa Postal 215-B, Sao Paulo, Brazil.)

The condition of this small stream, which receives the wastes of a tannery, 5 textile works, and the sewage of a town, is described.

---

(13) "Toxicity of Industrial Wastes", H Heukelekian. *Water Sewage Works* 95, 285-287 (1948).

(22 West Maple Street, Chicago 10, Ill.)

Methods of studying the toxicity of industrial wastes to bacteria and fish life are discussed.

II WASTE REDUCTION AND PREVENTION

A Process Control for Waste Reduction at the Source

(1) "Industrial Waste Surveys of Two New England Cotton Finishing Mills", M Burford, J Masselli, W Snow, H Campbell and F Deluise. Prepared for the New England Interstate Water Pollution Control Commission.

(73 Tremont Street, Boston 8, Mass.)

The authors of this eighty-two page report have made a very complete study of the waste from each process of the two mills covered therein. Tables show the data taken, which includes Mineral Acidity, Total Acidity; Hydroxide, Carbonate, and Bicarbonate Alkalinities; Total, Volatile, Fixed, and Suspended Solids; Oxygen Consumed and Biochemical Oxygen Demands. A complete description of each mill process is given and the weight of material processed is tabulated. The survey also embodies a study of each organic compound used in the mills with regard to their potential BOD.

Conclusions indicate that a concentrated effort toward substitution of processing compounds could result in an over-all reduction of pollution between 50 to 70 percent. Since desizing wastes are the major offenders, as indicated by the mill study, the authors recommend the investigation into synthetic sizing materials as possible substitutes for starch.

(2) "A Practical Approach to Textile Pollution Abatement and Waste Treatment", D W Snyder. *Am Dyestuff Reptr* 41, No. 23, 745-46 (1952).

(Howes Publishing Co, Inc, 44 East 23rd Street, New York 10, N Y.)

The technical staff of the average textile dyeing and finishing plant can best handle their own abatement problem because of their knowledge of the processes and conditions existing at the plant. Pollution abatement begins only after a thorough examination of the operation producing pollution and the waste. There are many ways of reducing pollution, e g, careful chemical controls and process changes along with education of operating personnel to make them pollution conscious. Waste treatment should never be undertaken without first instituting a pollution-abatement program. If the manufacturer takes the initiative in solving his own pollution problem, no regulatory body will make unreasonable demands on him.

---

(3) "Chemical Engineering Aspects of Industrial Waste Control", C Fred Gurnham. *Sewage Ind Wastes* 23, 82-8 (1951).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

Typical applications of "Unit processes" and "Unit operations" to industrial-waste problems are discussed.

(4) "Synthetic Detergents and Sewage Processing", A L Waddams. *Inst Sewage Purif, J Proc* 32-52 (1950).

(34 Cardinal's Walk, Hampton-on-Thames, Middlesex, England.)

The presence of 100 ppm of synthetic detergent in sewage is unlikely. This concentration is negligible. The concentration in normal detergent operations is 3,000 ppm. Up to 200 ppm, there is little effect on settling of suspended solids, and up to 500 ppm, little or no effect on bactericidal properties, except in the case of cationic detergents, which are bactericidal in concentrations as low as 1 ppm. Concentrations below 750 ppm have no effect on sludge digestion. High concentrations interfere with acid cracking processes in wool-grease recovery. Flocculation with alum and mechanical flocculation are effective where high concentrations of synthetic detergents are encountered.

---

(5) "Effects of Synthetic Detergents Pollution. Effect on Coagulation", J T Cross. *J Am Water Works Assoc* 42, 17-22 (1950).

(521 5th Ave, New York 17, N Y.)

Six detergents (no mention of ionic type) were tested to determine their effect in coagulation. Alum, ferric sulfate, and chlorinated copperas used alone were not very effective but showed improvement when used with lime.

---

(6) "Waste Treatment in Cotton-Finishing Plants", Geo G Bogren. *Am Dyestuff Reptr* 39, 669-71 (1950).

Howes Publishing Co, Inc, 44 E 23rd Street, New York 10, N Y.)

The cost of treating waste water is of serious concern to the textile industry. Of paramount importance is the separation from wastes requiring treatment of those wastes light enough in polluting constituents to permit their discharge to a receiving body of water without treatment. Typical discharged wastes are listed. The treatment of waste water is described in detail including the separation and elimination of light wastes, the use of equalizing and subsiding basins, chemical neutralization, chemical precipitation, and biological treatment methods. Of the available methods of biological treatments the trickling filter is the one most adaptable to combined cotton-finishing wastes because of its ability to maintain a reasonably constant degree of purification with wastes of varying character. Where a high degree of purification is required, intermittent sand or other fine-media filters are effective, but comparatively expensive to construct and maintain.

---

(7) "Experiments in Anaerobic Digestion of Wool Scouring Wastes", M T Singleton. *Sewage Works J* 21, 286-89, 293 (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

A pilot plant of 2,500-gal anaerobic digestion tanks was operated in series of 2½ months on wool-scouring wastes averaging 28,000 ppm volatile matter, 11,000 ppm grease, and 10,000 ppm BOD. At loadings of 0.06 lb volatile organic matter per cubic ft per day, gas yields of 8.6-14.0 cubic feet per lb were obtained. Volatile matter was reduced 65%, grease 90%, and BOD 82%.

---

(8) "Relation of Stream Characteristics to Disposal of Chemical Manufacturing Effluents", V L King, R F Bann, R C Conn, R E Lester, J E Stanley and D Tarvin. *Sewage Works J* 21, 534-552 (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

The Raritan River discharge, dissolved oxygen, and BOD are tabulated with reference to wastes from Calco Chemical Co. Calco waste-treatment facilities are described. Liquors containing sulfides, polysulfides, and hydrosulfites are oxidized by an acid-thiosulfate-sulfide treatment, followed by hot-waste acid treatment, which reduces oxygen consumed from 100,000 ppm to below 5,000 ppm. Sulfur dioxide is stripped out for recovery. Recovery plants for alcohols, pyridine and aniline are situated at the source. Oils are trapped. Wastes are composted in settling basins, neutralized with lime to pH 4, then lagooned. Four tons of solids settle in the basin and 6 tons in the lagoon per day. A diffusion dam povides both diffusion and aeration for the effluent. Foams resulting from discharges are trapped down stream by seines.

---

(9) "A High-Rate Trickling Filter Pilot Plant for Certain Chemical Wastes", B W Dickerson. *Sewage Works J* 21, 685-693 (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

An exceptionally high-rate trickling filter was dosed with 50 million gallons per acre per day with a recycling ratio of 40:1. The influent contained phenolic, formaldehyde, and resin-oil wastes. With formaldehyde loading up to 265 ppm, 2.59 lb formaldehyde was removed per cubic yard of stone. Efficiency of removal by filter was 23-40%, and over-all removal of original waste 80-90%. pH was controlled between 4.5 and 8.5. Effluent was lagooned for further purification.

---

(10) "Developments in the Treatment of Dyehouse Wastes", S L Zack. *Sewage Works Eng* 20, 129-130 (1949).

(Case-Sheppard, Mann Publishing Corp, 24 W 40th St, New York 18, N Y.)

Alkaline dyehouse waste with suspended solids varying from 100 to 3000 ppm and BOD from 400 to 4000 ppm was treated by equalization, lime and copperas coagulation, settling, and sludge returns, removing 70% BOD and 60% solids. Aftertreatment in a pond increased removal to 91.3% solids and 92.4% BOD.

---

(11) "Flax Retting with Aeration. A Process of Reusing an Industrial Waste Water". B A Southgate. Dept Sci Ind Research (Brit) Tech Paper No. 10, Water Pollution Research, 146 pp (1948).

(British Library of Information, 270 Madison Ave, New York 16, N Y.)

Waste water obtained from retting flax by the anaerobic methods is very strongly polluting. The polluting character (judged by the amount of 1/30 N $KMnO_4$ reduced in 4 hr at 26.7°C) of the waste water was reduced by 50% by the addition of ferric chloride or ferrous sulfate. Bleaching powder, calcium hydroxide (alone or with ferrous sulfate or aluminum sulfate), or calcium chloride was less effective. The necessity for large-scale waste-water treatment by flax-retting establishments was avoided by reusing the retting liquor and continuously aerating the liquor in the retting tank. Scutched flax of satisfactory quality was produced by this process.

---

(12) "Four Wastes—One Effluent", B M Scheuer. *Chem Eng* 55, No. 2, 138-140 (1948).

(McGraw-Hill Publishing Co, Inc, 330 W 42nd St, New York 18, N Y.)

Treatment of sanitary sewage, sulfide, alkaline, and acid wastes from a rayon producing plant is performed to produce a clear effluent. Flow sheet and description is given.

---

(13) "The Treatment of Highly Colored Waters", C R Harlock and M R Dowlin. *Water Sewage Works* 95, 440-442 (1948).

(22 West Maple Street, Chicago 10, Ill.)

Color is removed from surface supply waters containing 300-600 ppm color and 20 ppm alkalinity, with 1 ppm iron per 100 ppm

color, by coagulation with aluminum sulfate, dosed at a rate of 1 gram/gal/50 ppm color present, and by addition of 10-20 ppm sodium aluminate. Residual alkali is released in settling basins. Sodium aluminate must be added at various points to avoid color release by locally high pH. Prechlorination is used to remove odors in summer months.

---

(14) "New Method of Clarifying Industrial Water", E N Teterkin. *Stal* 8, 177-182 (1948).

(Metallurgizdat, Moscow, USSR.)

Description of an industrial-type clarifier wherein incoming water is passed upward through the coagulum of previous clarification, the coagulum acting as a coagulant.

---

(15) "Oxidation of Reduced Sulfur Compounds in Sewage", H Heukelekian and R Lassen. *Sewage Works J* 19, 989-994 (1947).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Sodium sulfide, sulfite, bisulfite, and hydrosulfite (concentration of 100 ppm) were added to sewage, the normal flora of which was modified by heat sterilization and by adding activated sludge and trickling-filter slime. Hydrogen sulfide and sulfur dioxide were added to water seeded with 1 ml sewage per liter. Aeration of mixtures proved that added materials were oxidized, but rate of oxidation was greatly increased by activated sludge, filter slime, and sewer bacteria. Fresh domestic sewage containing 7-12 ppm reduced sulfur compounds are oxidized completely by aeration.

---

(16) "Treatment of Textile Wastes at Huddlesfield", H H Goldthorpe. *Inst Sewage Purif, J Proc* 144-151 (1946).

(34 Cardinal's Walk, Hampton-on-Thames, Middlesex, England.)

A general discussion of the wastes encountered and methods of controlling treatments in the textile city of Huddlesfield, England.

---

(17) "Elimination of Waste in Bleachery Management", W L Conrad. *Am Dyestuff Reptr* 15, 283-4 (1926).

(Howes Publishing Company, Inc, 44 East 23rd Street, New York 10, N Y.)

Old wasteful methods are discussed and a plea is made for modern scientific management.

---

(18) "Water Pollution Abatement Manual for Insoluble and Undissolved Substances". Manual Sheet W 2.

(Manufacturing Chemists' Association, Inc, 246 Woodard Building, Washington 5, D C.)

This article discusses the effect that insoluble and dissolved substances have on the receiving body of water. Four methods are considered for the elimination or reduction of waste solids in water. These are 1) screening, 2) sedimentation, 3) flotation, and 4) filtering. The problems of sludge digestion, dewatering and disposal are briefly discussed.

B By-Product Recovery and Utilization

(1) "Apparatus for Recovering Oil and Solvent Resulting from a Continuous Solvent Treatment of Raw Wool or Wool Fabric", Roland E Derby. US Patent 2,631,971, March 17, 1953.

---

(2) "Rayon Waste Recovery and Treatment", H L Jacobs. *Sewage Ind Wastes* 25, 296-304 (1953).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

The source of wastes from the manufacture of rayon and cellophane is the discarded viscose which comes from the cleaning of presses, the starting-up of spinning and casting machines, and occasional substandard batches. Other sources are the dialyzer and coagulating and coating baths. Efforts were expended in recovery of useful material and reduction of losses resulting in polluting wastes.

---

(3) "Recovery of Copper in the Copper Fiber Process", Franz Gerstner. *Z Elektrochem* 57, 221-5 (1953).

(Verlag Chemie, GmbH, Haupstr 127, Schliessfach 149 (17a), Weinheim/Bergstr, Germany.)

Copper is recovered from the waste waters from the spinning of cuprammonium rayon by ion exchange with the acid form of phenol-formaldehyde-sodium sulfite resins.

---

(4) "Alcohol Abstraction of Wool-Scouring Wastes", Harold Lundgren. *Textile Research J* 21, 140-55 (1951).

(10 E 40th Street, New York 16, N Y.)

Wool is degreased by the use of butyl alcohol, and grease is recovered by cooling or change of alcohol concentration.

---

(5) "A Method of Treatment of Wool-Scouring Wastes", J A McCarthy. *Sewage Works J* 21, 75-83, (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Alkaline wastes were treated with 0.8 to 1.8% by weight of calcium chloride, and the pH was reduced to 8 with carbon dioxide from flue gas. A clear effluent was produced. The sludge settled to 4-8% solids. This value could be increased to 22% by stirring and resettling. The removal in pilot-plant studies of 4 wastes was suspended solids 99%, fats 91-98%, BOD 62-88%. The effluent BOD of 1,000 to 2,000 ppm could be reduced to 100 ppm by high-rate filters at loads of about 1200 lb BOD per acre foot.

---

(6) "German Meat Packing and Fat and Oil Operations During the War Period", George T Carlin. *Food Technol* 1, 404-14 (1947).

(119-123 W Park Ave, Champaign, Ill.)

The production, equipment, and standards of the German fresh, canned, frozen, cured, and dehydrated-meat industries are discussed. Oidium lactis and tortula yeasts were grown on the neutralized waste liquors of the paper and textile mill industries to produce a meat substitute.

---

(7) "Recovery, Processing, and Marketing of By-Products at the Esholt Works of the Bradford Corporation", W H Hillier. *Inst Sewage Purif, J Proc*, (1947).

(34 Cardinal's Walk, Hampton-on-Thames, Middlesex, England.)

Half of the normal daily river flow of 18 million gallons is waste from wool scouring and dyeing. The crude sewage contains an average of 1200 ppm suspended solids and 640 ppm grease and has an oxygen absorption of 228 ppm (4 hours, 80°F). Screening and detritus tanks remove most of the heavy solids, then sulfuric acid is added to impart acidity of 100 ppm to methyl orange. The sludge, deposited in precipitation tanks, contains most of the grease. The effluent contains an average of 112 ppm solids and 56 ppm grease and has an oxygen absorbed value of 117 and BOD of 284 ppm. It is treated on biological filters containing 6' of coal at 35 gal/day/cu yd of medium. The effluent is passed through humus tanks, and a clarification tank then is discharged to the river Aire. The final effluent contains an average of 32 ppm suspended solids and has an oxygen absorbed value of 26, a BOD of 22 ppm, and is non-putrescible.

(8) "Experiments on Precipitation of Trade-Wastes Sewage", C Lumb, J P Barnes, and J Blackburn. *Inst Sewage Purif, J Proc*, 96-105 (1947).

(34 Cardinal's Walk, Hampton-on-Thames, Middlesex, England.)

Halifax sewage contains grease and soaps from textile mills. Sulfuric acid is used as precipitant preparatory to grease recovery and final purification in percolating filters. Experiments showed chlorinated copperas to be most effective when the oxygen-absorbed test is used as criterion. Maximum coagulation occurred between pH 4 and 5 with ferric chloride plus ferric sulfate. pH adjustment with sulfuric acid or addition of lime reduced the amount of copperas needed. Ultrafiltration showed that some true solutions were removed in addition to colloidal suspensions. This might explain the superiority of ferric ion over sulfuric acid. Nearly all iron added is precipitated except where surplus is used. This increases bulk and weight of sludge and might tend to immobilize phosphorus when the sludge is used as fertilizer.

---

(9) "Effluent Problems in the Staple-Rayon Industry", H Barkholt. *Kunstseide u Zellwolle* 25, 312-16 (1947).

(H Jentgen Verlag KG, Drakestr 45, Berlin-Lichterfelde-West, Ger.)

A general discussion with illustrations of the prevention of pollution and the recovery of chemicals from the viscose process.

---

(10) "Recovery and Processing of Wool Grease", W H Hillier and S G Campbell. *Synthetics and By-Products* 8, 329 (1946).

(Leonard Hill Ltd, 17 Stratford Place, London W1, England.)

29% of the world's wool production is washed in Bradford. Severe water contamination led to the development of a recovery plant. A flow diagram shows the process used for recovering wool grease from 20 million gallons of sewage daily in which precipitation tanks, biological filters, sulfuric acid treatment, grease removal and distillation are utilized.

---

(11) "How Research Solved the Problem of Utilization". *Synthetics and By-Products* 8, 375 (1946).

(Leonard Hill Ltd, 17 Stratford Place, London W1, England.)

By the middle of 1935 large amounts of grease recovered from process described in above abstract had accumulated. Applications for this product were found in the paint industry, quick-drying water paints, rust preventives, magnesium-soap vehicles, axle grease, greasing army boots, etc.

---

(12) "Sulfide Wool Wastes Endanger Sewer System", A M Rawn. *Sewage Works Eng Munic Sanit* 16, 491-3 (1945).

(Case-Sheppard-Mann Pub Corp, 24 W 40th St, New York 18, N Y.)

Wool wastes containing soluble sodium sulfide mixed with sewage produced hydrogen sulfide in sewers; this resulted in odor nuisances, and the hydrogen sulfide on oxidation destroyed concrete pipe joints in Los Angeles sewers. The company tried to reduce soluble sulfides by addition of zinc sulfate; this proved too expensive. The concentrated rinse was returned for reuse and the remainder was treated with ferrous sulfate. The value of sodium sulfide salvaged exceeds the cost of neutralization.

---

(13) "Textile Processing Wastes, Treatment and Recovery", H B Gotaas. *Am Wool Cotton Reptr* 55, No. 5, 9-10, 17 (1941).

(Frank P Bennett & Co, 286 Congress Street, Boston 10, Mass.)

Domestic sewage and chemical treatments, waste reduction and recovery of by-products are discussed.

(14) "The Purification and Utilization of Waste Liquor from Retting", Harold Fried. *Faserforschung* 14, 113-14 (1939).

(Fr Tobler, Stubelallee 2, Dresden-A-16, Germany.)

The liquor contains mineral salts and organic matter suitable for fertilizer. However, plants do not thrive on it, probably on account of the presence of too much acid and sugars that stimulate the growth of harmful bacteria or the formation of antiseptic materials, such as alcohol and acetone. The liquor can be purified by aeration or by the addition of lime, after which it can be safely run off or further treated to recover valuable chemicals and fertilizers or fuel.

---

(15) "Utilizing Waste Products Obtained on Retting Flax and Hemp", Max Ludtke. *Textilber* 20, 253-6 (1939).

(Ebertplatz 3, Postfach 181, Heidelburg, Germany.)

The analysis of seed chaff from linseed and rye indicates possibilities of its utilization as feed for animals, especially in combination with molasses, potatoes, etc. Solid waste products from breaking and scutching may be used more or less advantageously 1) for fertilizer, bedding for animals or fuel, 2) for making wall board, 3) as a source of cellulose, 4) as an adhesive in papier-mache or in sand molds for castings, 5) as a source of wax and 6) to ferment to make alcohol. By careful application of the waste water from retting to areas under cultivation or in meadow, the nitrogen, phosphorus, and potassium present in the waste water may be utilized.

---

(16) "Regenerating Fatty Substances from Waste Waters of the Wool Industry", V N Sokolov. *Sherstyanoe Delo*, No. 4-5, 24-6 (1935).

(Soyuspechat, Moscow, USSR.)

A description of a simplified sulfuric acid method of regenerating fats from waste waters and of soap-making by boiling.

---

(17) "Wool-Scouring Waste Liquors—Composition and Disposal", F P Veitch and L C Benedict. *Trans Am Inst Chem Eng*, June (1925).

(Amer Inst of Chemical Engineers, 120 East 41st St., New York 17, N Y.)

A discussion of the chief methods of purification of the waste liquors and of the possible utilization of the wastes.

---

(18) "Ultra-Filtration of Wash Waters from Wool", Anon. *Halle aux cuirs* 568 (1925).

(36 rue Debelleyme, Paris (3e), France.)

Cholesterol and higher fatty acids may be recovered by filtration through a nitrocellulose membrane.

---

(19) "Wool Scouring Wastes", C S Palmer. *Trans Am Inst Chem Eng* 12, Pt I, 113-9 (1919).

(Amer Inst of Chem Eng, 120 East 41st St, New York 17, N Y.)

An outline of the forthcoming investigation of the US Bureau of Chemistry, which comprises 1) the recovery and uses of "wool grease", 2) recovery of potassium compounds, 3) recovery of soap wastes, 4) recovery of fertilizer material, and 5) clarification of the final effluents from the point of view of sewage purification. Properties of wool grease, little known though not new, are included.

---

(20) "Separation, Analysis, and Utilization of Wool-Grease Components", John T Scanlon. *Woolfacts*.

(Wool Bureau Inc, 16 West 46th St, New York 19, N Y.)

A research project of the Eastern Regional Research Laboratories is the separation, analysis and utilization of wool-grease components.

III WASTE TREATMENT

A Without By-Product Recovery

(1) "Disposal of Caustic Waste Liquor from the Textile Industry", William R Steele and John V McMahon (to Allied Chemical & Dye Corp). US Patent 2,632,732, March 24, 1953.

Strongly caustic waters from textile mills are rendered relatively harmless by treating with carbon dioxide to lower the pH, oxidizing the organic impurities with chlorine, and then diluting with water to dissolve the residual precipitate and improve the color. The treated solution may then be delivered to sewage plants as they are now harmless to digestive microorganism or other useful aquatic life.

---

(2) "Waste Treatment, An Important Element in Industrial Plant Location", Truman H Safford. *Water Sewage Works* 99, 113-15 (1952).

(22 West Maple Street, Chicago 10, Ill.)

A review.

---

(3) "Treatment of Cotton-Finishing Waste at Sayles Finishing Plants, Inc", George G Bogren. *Sewage Ind Wastes* 24, 994-1000 (1952).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Illinois.)

A 92% reduction in BOD was obtained in 1941-50 on part of the wastes by means of primary subsiding basins, a trickling filter and a fine under filter. A 75% reduction in BOD is expected to result from additional treatment works, which will employ primary subsiding basins, high-rate trickling filters and secondary subsiding basins.

---

(4) "Treatment of Waste Water from the Textile-Processing Industry in Coesfeld/Westfalen", H Schulz-Falkanheim. *Textilber* 33, 650-1 (1952).

(Ebertplatz 3, Postfach 181, Heidelburg, Germany.)

The waste water from the textile-processing mills of Coesfeld/Westfalen is combined with the sewage of the town, making 46% of the total of 4500 cubic meters per day in dry weather. After running through a trash rack, the water is pumped (most of the cost paid by the mills) 6 meters high and let flow over treatment plots under gravity. The outflow is pure enough so as not to contaminate the local stream even in low water, and the plots were usable as pasture.

---

(5) "Two Industrial Waste Problems at New Haven, Conn", Kenneth E Foote. *Sewage Industrial Wastes* 24, No. 10, 1305-07 (1952).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Illinois.)

High-Chlorine-Demand Waste: A high chlorine demand was found in the new-sewage-plant effluent even when 2000 lb/24 hours of chlorine was used. Also, a strong color was noticed. This high chlorine demand was traced to a textile-dyeing plant. It was corrected by the dyeing plant building holding tanks and using a uniform discharge rate to the sewers and increased chlorination at the treatment plant.

---

(6) "Waste-water Problems in the Textile Industry", H F Kuisel and Rud Ott. *Textil-Rundschau* 7, 216-22 (1952).

(Zollikofer & Co, Buchdruckerei, Postfach 1427, St Gallen, Switzerland.)

The best method of disposal is to mix the industrial waste water with domestic waste waters of a municipality and to charge the mixture to a sewage-disposal plant operating by biological purification. The industrial waste water must be pretreated to make certain that it will not interfere with the biological process. This may involve adjustment of temperature, or pH, or precipitation and filtration to remove undesirable chemicals.

---

(7) "Research in Textile-Waste Problems", R H Souther. *Proc First Southern Municipal and Industrial Waste Conference*, 102-110 (1952).

(Department of Engineering Research, North Carolina State College, Raleigh, N C, Bulletin No. 55.)

Research at Cone Mills by the Textile Research Foundation on treating kier, bleaching, sulfur, direct, aniline-black, indigo, and printing wastes was discussed. Calcium chloride used on indigo and sulfur-colors dye waste, and alum and sulfuric acid treatment on indigo dye wastes. Textile wastes and municipal wastes are cheaper treated together than separated. Alkalinity neutralized with CO_2 from stack gases make textile wastes more stable in pH, thus easy to use biological treatment for combined wastes. Shallow lagoons increase ratio of textile wastes that can be handled in municipal treatment plant; aeration, pH adjustment, and chemical coagulation also increase this ratio.

---

(8) "Biological Treatment of Industrial Wastes", Willem Rudolfs and H Heukelekian. *Chem Eng Progress* 48, 449-54 (1952).

(Am Inst of Chemical Engineers, 120 E 41st Street, New York 17, N Y.)

A review of the theory and published information regarding the actual installation and pilot-plant experiences of biological processes for the treatment of industrial wastes, showing to what extent and with what success such methods have been used. Treatment can be accomplished under anaerobic or aerobic conditions or by utilizing a combination of these two procedures. Theoretically, biological treatment is not only feasible but is also similar for all types of organic wastes.

---

(9) "Use of Calcium Chloride in the Treatment of Industrial Wastes", Joseph A McCarthy. *Sewage Ind Wastes* 24, 473-9 (1952).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Full-scale tests with calcium chloride in the treatment of wool-scouring wastes gave removal of BOD ranging from 51 to 73%; suspended solids and hexane-soluble removal approached 99%. Calcium chloride treatment was also effective on fulling-mill and rouge wastes.

---

(10) "Textile Dye Wastes", Nelson L Nemerow. *Chemical Age* (June 14, 1952).

(Bouverie House, 154 Fleet Street, London EC4, England.)

The pollution character of textile dye wastes depends upon the type of dye used, which in turn depends to a great extent upon what kind of cloth is being dyed and the specifications of the finished dyed cloth. The main dyes are 1) direct colors, 2) sulfur colors, 3) vat colors, 4) acid colors, 5) developed colors, 6) naphthol colors, 7) acetate colors. There are at least five ways in which a textile dye waste must be treated before it is discharged into a municipal sewer for further treatment: 1) equalization, 2) neutralization, 3) proportioning the flow to that of domestic sewage, 4) removal of colored matter, and 5) removal of oxygen-chlorine demanding matter.

(11) "Neutralization of Acid Wastes", H L Jacobs. *Sewage Ind Wastes* 23, 900-5 (1951).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

The neutralization characteristics of various types of lime available for treatment of acid wastes and their effectiveness are discussed.

---

(12) "Nutritional Requirements in the Biological Stabilization of Industrial Waste. II—Treatment with Domestic Sewage", E N Helmers, J D Frame, A E Greenberg and C N Sawyer. *Sewage Ind Wastes* 23, No. 7, 898-99 (1951).

(Federation of Sewage and Industrial Wastes Assoc, 323 Illinois Bldg, Champaign, Ill.)

Experiments were conducted on a laboratory scale with activated sludge for the stabilization of an industrial waste-domestic sewage mixture containing variable amounts of industrial waste. Three different industrial wastes were used: cotton-kiering waste, rag-rope-pulping waste, and a brewery waste. All experiments were carried out with three feedings a day followed by 7-hour aeration periods. Temperatures of stabilization were controlled at 10°, 20°, and 30° C. The nutritional requirements of the activated sludge in terms of nitrogen and phosphorus were computed for different conditions of BOD loading and temperature.

---

(13) "Chemical Engineering Aspects of Industrial Waste Control", C F Gurnham. *Sewage Ind Wastes* 28, 82-88 (1951).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Illinois.)

A general article citing several processes and operations in the treatment of industrial wastes.

---

(14) "Hypochlorination of Water". 7th Edition, Revised, 1951.

(Mathieson Chemical Company, Niagara Falls, N Y.)

This article discusses the use of high-test hypochlorite as well as liquid chlorine and chlorine dioxide for purification of water. Merits of the combined-residual chlorination and free-residual chlorination processes are discussed. The ammonia-chlorine treatment, where purification depends upon the formation of chloramines, is also mentioned; and the merits and demerits of this treatment are described.

One chapter is devoted entirely to the control of algae and proper dosage to be used to control them.

A section is devoted to hypochlorination for sewage treatment, and the article includes numerous tables, which give detailed and specific information for specific chlorine applications.

---

(15) "Stream Pollution Alleviated at Pepperell by Processing Sulfur-Dye Waste", Harold R Murdock. *Textile Inds* 115, No. 8, 118-9 (1951).

(W R C Smith Publishing Co, 806 Peachtree St, NE, Atlanta, Ga.)

The small amount of waste effluent from the sulfur dyeing operation influences the over-all waste disposal problem at the Opelika, Ala, plant of the Pepperell Manufacturing Co. The deleterious influence lingers in the receiving stream long after the processing step of sulfur dyeing has ceased. The balance of the wastes from the mill would not adversely affect the natural condition of the stream, provided the sulfur dyeing effluent were processed to eliminate all of the dye, sodium sulfide, and chromium present in the waste. The layout for the waste treatment developed for this plant is shown.

(16) "Modern Wastes—Treatment Plant for Carpet Mill of James Lees and Sons at Glasgow, Va", S E Coburn. *Water Sewage Works* 97, 167-171 (1950).

(22 West Maple Street, Chicago 10, Ill.)

Alkaline wool-scouring wastes are equalized in flocculation tanks, transferred to chambers where spent dye wastes are added, dosed with sulfuric acid to adjust the pH and to coagulate grease and colloidal matter, and transferred to flocculation and sedimentation tanks. The effluent is neutralized with calcium hydroxide, settled, discharged to river. Waste calcium hydroxide sludges from water treatment plant are satisfactory for neutralization.

---

(17) "Clarification Unit for Mechanical and Biological Purification of Domestic and Industrial Wastes", L v Roll A G fur kommunale Anlagen. Swiss Patent 264,918, Feb 1, 1950 (Cl 43).

A purification unit is described, which consists of two clarification tanks with drip arrangements above settling basin.

---

(18) "An Inquiry into the Possibility of Utilization of Hygienic Disposal of Textile Wastes: Chemical Precipitation of Kier and Dye Wastes", C V Sabnis. *Indian J Med Research* 38, 357-68 (1950).

(23 Samavaya Mansions, Corporation Place, Calcutta 13, India.)

Lime, iron salts, calcium chloride, and alum were used as clarification agents with a view to possible reuse or recovery of the chemical constituents of kier liquors and dye wastes. Filtration experiments employing sand, charcoal, lime, and gypsum were included as well as aeration of the waste liquors. Results so far obtained show that it would be cheaper to dispose of such wastes in a hygienic way rather than reclaim them.

---

(19) "Waste Treatment in Cotton-Finishing Plants", Geo G Bogren. *Am Dyestuff Reptr* 39, 669-71 (1950).

(Howes Publishing Co, Inc, 44 E 23rd Street, New York 10, N Y.)

The cost of treating waste water is of serious concern to the textile industry. Of paramount importance is the separation from wastes requiring treatment of those wastes light enough in polluting constituents to permit their discharge to a receiving body of water without treatment. Typical discharged wastes are listed. The treatment of waste water is described in detail including the separation and elimination of light wastes, equalizing and subsiding basins, chemical neutralization, chemical precipitation, and biological treatment methods. Of the available methods of biological treatments the trickling filter is the one most adaptable to combined cotton-finishing wastes because of its ability to maintain a reasonably constant degree of purification with wastes of varying character. Where a high degree of purification is required intermittent sand or other fine-media filters are effective, but comparatively expensive to construct and maintain.

---

(20) "High-Rate Trickling Filter Operation on Formaldehyde Wastes", B W Dickerson. *Sewage Ind. Wastes* 22, 536-545 (1950).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Plant wastes were reduced by replacing barometric condensers with surface condensers, reuse of process water and discharge of certain sludges to disposal areas. The waste was reduced to 40,000 gal/day, 300 lb formaldehyde, 675 lb BOD, of which 600 lb was due to formaldehyde. Wastes are applied to a 35' diameter by 6'

deep filter with a 40:1 recirculation rate and a dosing rate of 52 million gals/day. Wastes are neutralized to pH 7 with ammonia, which introduces nitrogen for biological growth. Ammonium acid phosphate is added to provide phosphorus. Influent BOD varied from 1400 to 3100 ppm. This was reduced to 340 ppm in filter effluent, and further reduced to 170 in a lagoon with a 9-day capacity.

---

(21) "Treatment of Cotton-Finishing Waste Liquors", Geo G Bogren. *Ind Eng Chem* 42, 619-621 (1950).

(American Chemical Society, 1155 16th St, NW, Washington 6, D C.)

Pilot-plant studies for the treatment of cotton-finishing wastes, varying widely in alkalinity, in shallow, high-rate trickling filters indicates that BOD reductions of at least 60% can be expected.

---

(22) "Waste Treatment Cost Need Not be Excessive", Wendell B Goode. *Textile World* 100, 100 (1950).

(McGraw-Hill Publishing Co, 330 W 42nd St, New York 18, N Y.)

This article discusses the treatment and cost of treatment of wool-finishing wastes from the following processes: dry cleaning, carbonizing, washing, fulling, continuous scouring, and dyeing. The layout of the waste-disposal system is discussed in some detail and diagrammed. An analysis sheet showing the chemical composition of two composite waste samples before and after treatment is given. The operation of the treatment plan is discussed, and a sample control sheet is shown with a breakdown of the cost of treatment for 8.5 million gallons.

---

(23) "Characteristics and Treatment of Wool-Dyeing Wastes", J A McCarthy. *Sewage Ind Wastes* 22, 77-86 (1950).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

Wool dyeing wastes are stronger than normal sewage, but weaker than wool scouring wastes. Sedimentation and coagulation are not too effective. Wastes can be treated on trickling filters with loadings of 1000 to 5000 lbs per acre foot. Recirculation is beneficial. High or low pH values reduce efficiency.

---

(24) "Biological Oxidation of Formaldehyde", I Gellman and H Heukelekian. *Sewage Ind Wastes* 22, 1321-1325 (1950).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

By successive inoculation, an active pink-seed sludge was developed, which would oxidize 1750 ppm formaldehyde in a Warburg "direct-method" oxygen-utilization apparatus, or 95% of the formaldehyde present in 24 hours. Nitrogen was found necessary in a BOD-to-nitrogen ratio of 40 to 1. Potassium hydrogen phosphate was used as a source of phosphorus and also as a buffer for neutralization. Sludge was mostly Bacterium Methylicum, and retained viability during a 5-day storage.

---

(25) "Purification of Textile Wastes", M Kehren. *Textilber* 31, 363-6 (1950).

(Ebertplatz 3, Postfach 181, Heidelberg, Germany.)

The Nier process of sewage treatment is carried out in 5 steps. 1) The major portion of the coarse, solid impurities are removed by preliminary clarification. 2) The sewage is brought into contact with iron turnings and air in special units, diagrams of which are given. The ferric hydroxide formed acts as a flocculating agent. 3) The floc settles out very rapidly after entering the precipitation basin. 4) Either trickling units or units operated by compressed air are used to remove remaining material, which can be eliminated only by biological purification. 5) The biological sludge is finally separated.

(26) "Waste Disposal", F W Mohlman. *Chem Eng Progress* 46, 521-7 (1950).

(American Inst of Chemical Engineers, 120 E 41st St, New York 17, N Y.)

The importance is stressed of adapting treatment and disposal of trade wastes to the capacity of the surface waters into which wastes are discharged. Neutralization of strong acid or alkali may be uneconomical but is not difficult unless organic acids with high potential BOD are present. Organic acid wastes require high stream flows or treatment by biological oxidation before discharge. Methods for reducing the content of oil, scum, and soluble organic matter and for removing sludge-forming solids and soluble chemicals, e g, sulfur, hydrocyanic acid, copper, chromium, iron, organic acids, antibiotics, and dyes, are discussed in relation to US practice.

---

(27) "Treatment of Cotton-Printing and Finishing Wastes", S E Coburn. *Ind Eng Chem* 42, 621-625 (1950).

(American Chemical Society, 1155 16th St, NW, Washington 6, D C.)

The use of high-rate trickling filters and chemical precipitation are compared through pilot-plant operations. Analytical, operating-cost, and efficiency data indicate lower net annual cost for a filter plant, fewer operational complications and a less serious sludge-disposal problem.

---

(28) "Effects of Certain Detergents on Sewage Treatment", W Rudolfs, R Manganelli and I Gellman. *Sewage Works J* 21, 605-612 (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Complete replacement of the usual 20-50 ppm soap in sewage by detergents would reduce BOD 15-40 ppm. Ten to 100 ppm of detergent progressively reduced efficiency of solids sedimentation, grease, and BOD removal. Detergents showed no toxic effects in BOD determinations by dilution and direct manometric oxidation methods, caused decrease in activated-sludge volume index, and increased solids and BOD effluent. Anaerobic digestion was not affected in amounts up to 100 ppm, although there was a slight decrease in gas formation.

---

(29) "Developments in the Treatment of Dyehouse Wastes", S I. Zack. *Sewage Works Eng* 20, 129-130 (1949).

(Case-Sheppard-Mann Publishing Corp, 24 W 40th Street, New York 18, N Y.)

Alkaline dyehouse waste with suspended solids varying from 100 to 3000 ppm and BOD from 400 to 4000 ppm were treated by equalization, lime and copperas coagulation, settling, and sludge returns, removing 70% BOD and 60% solids. Aftertreatment in a pond increased removal to 91.3% solids and 92.4% BOD.

---

(30) "Experiments on Anaerobic Digestion of Wool-Scouring Wastes", M T Singleton. *Sewage Works J* 21, 286-93 (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A pilot plant, consisting of 2500 gal anaerobic digestion tanks, was operated in series for 2½ months on wool-scouring wastes with an average BOD of 28,000. At loadings of 0.06 lb of volatile organic matter per cu ft per day, gas yields of 8.6-14 cu ft per lb of volatile matter was obtained. Volatile matter was reduced 65%, grease 90%, and BOD 82%.

---

(31) "Textile Trade Effluents and Their Treatments", W P Hazeldine. *J Textile Inst* 40, 1090-1096 (1949).

(The Textile Institute, 10 Blackfriars Street, Manchester 3, England.)

A lecture on design and maintenance of purification plants.

(32) "The Effects of Acid and Alkaline Wastes and General Methods for Their Disposal", W B Hart. *Petroleum Processing* 3, 409-14 (1948).

(National Petroleum Publishing Co, 1213 W 3rd Street, Cleveland 13, O.)

A discussion of acid and alkaline wastes, their effects on surface waters (primarily pH), and methods of handling them. Two general disposal procedures are covered: controlled disposal, in which the waste material is discharged only in such quantities as can be diluted to a safe level by the receiving water; and neutralization, in which the deleterious effects of the waste are neutralized prior to disposal.

---

(33) "Patented Plan for Mechanical and Biological Purification of Wastes", L von Roll A G. Swiss Patent 252,762, Oct 16, 1948 (Cl 43).

(Swiss Technics, Swiss Office for the Development of Trade, Place Ripone 3, Lausanne, Switzerland.)

Design and working plan for the mechanical and biological purification of domestic and industrial waste water. Equipment is described to purify waste water from domestic and industrial sources. The incoming water to be purified is passed into a single compartment, which is designed mechanically to filter it and then follow with a conventional biological purification to remove all undesirable impurities. The arrangement is made possible by a pump which conducts the water from the filter bed through a reservoir where the biological action takes place.

---

(34) "Lime for Industrial-Waste Treatment", E B Besselievre. *Sewage Works Eng Munic Sanit* 19, 19-20 (1948).

(Case-Sheppard-Mann Publishing Co, 24 W 40th Street, New York 18, N Y.)

Lime is recommended for treatment of mine waters, coffee-bean waste, textile, gashouse, vegetable-cannery, creamery, pickling-liquor, strawboard, corn-products, roofing-paper, packing-house, chromium-plating, and distillery (whiskey) wastes. Lime should be fed dry and thoroughly mixed mechanically.

---

(35) "Treatment and Disposal of Waste Soluble Oils", E F Eldridge and R W Purdy. *Sewage Works J* 20, 849-856 (1948).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Emulsions can be cracked with 1.8, 5.4, 29.4 mgms/liter of calcium chloride, ferrous sulfate, and sulfuric acid, respectively, to obtain 95-98% separation of oil and water. Calcium chloride gives best results. The separated water containing 200-1,000 ppm oil is flocculated with 34.4 and 100-170 mg/l, respectively, of calcium oxide and ferric sulfate to produce an effluent containing less than 15 ppm oil and a BOD of less than 100 ppm. Batch and continuous designs for treatment are described.

---

(36) "The Determination of the Type and Degree of Treatment Required for an Industrial-Waste Problem", Philip F Morgan. *Proc 3rd Ind Waste Conf, Purdue Univ Eng Bull, Extension Ser No. 64*, 74-84 (1947).

(Dean of Engineering, Purdue University, Lafayette, Ind.)

Information upon which to determine the capacity of a river to receive industrial wastes was obtained by establishing representative sampling points and compiling records of flow, dissolved oxygen, and wastes discharged. The data collected will be used to calculate deoxygenation and reoxygenation coefficients and to compute the oxygen-depletion curve for any given waste load studied.

(37) "Industrial Wastes. Textile Industry", J C Geyer. *Ind Eng Chem* 39, 653 (1947).

(American Chemical Society, 1155 16th Street, NW, Washington 6, D C.)

Deterging wastes, such as those from wool scouring, cotton kiering, silk degumming and others are highly polluting. Dye wastes, except sulfurs and vats, are only a little more polluting than domestic sewage. Sulfur and vat dyes are in strongly alkaline reducing baths. Some reuse of water is possible, and in special cases chemicals are recovered. Averaging must be for 24 hours because of the variability of the wastes. Coagulants are then used, with ferrous sulfate and lime most economical. If under 0.3 mgd, batch treatment may economically replace continuous operation. Sludge is lagooned or dried on sand beds. The precipitated and settled liquor may be filtered or chlorinated. Combination with domestic sewage is simplest and lowest in cost.

---

(38) "Hypochlorite Treatment of Wool-Scouring Wastes—A Discussion", J L Campanella. *Sewage Works J* 19, 255 (1947).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Experiments have been carried on to adapt the hypochlorite process to a continuous-flow process by combining it with the centrifugal process and later, with better results, with a machine. The results of the experiments are surprisingly satisfactory.

---

(39) "Industrial-Waste Disposal", G E Barnes. *Mechanical Eng* 69, 465 (1947).

(American Society of Mechanical Engineers, 29 W 39th Street, New York 18, New York.)

The effect of industrial wastes on municipal sewage treatment plants, methods used by industry to pretreat industrial wastes, and methods of charging industry for waste treatment are discussed.

---

(40) "Biological Treatment of Municipal and Industrial Wastes", J Johansson and R Sonden. *Tenknik Tidskrift* 76, 1353 (1946).

(Box 841, Stockholm 1, Sweden.)

At Boras, Sweden, a sewage plant employing mechanical treatment followed by high-rate biofilters and clarification basins treats a mixture of municipal and textile-plant wastes. A 75% over-all reduction of 5-day BOD is achieved the year around despite the use of open filters in 30° temperature at a load per unit volume of stone of 11.5 unit volumes per day containing 190 ppm of BOD. Forced ventilation through the filter or recycling of purified water did not definitely improve the reduction of BOD. Slightly polluted water discharged in the Stockholm archipelago, if allowed to stratify, will reduce the sulfates in the upper layer of sea water to hydrogen sulfide. The hydrogen sulfide on reaching the surface will kill fish and cause odors.

---

(41) "Recent Developments in Retting of Flax and Disposal of Waste Water", T W Brandon and C B Taylor. *J Soc Chem Ind* 65, 390 (1946).

(Society of Chemical Industry, 56 Victoria St, London SW1, England.)

Studies were carried out on pollution caused by effluent from flax-retting operations. Treatment of effluent by percolating filters and chemical coagulants proved impractical for industrial use. Treatment of water to permit reuse showed more promise. Anaerobic retting with reuse of liquor was unsatisfactory owing to rapid building up of acidity and subsequent decrease in retting rate. Continuous recirculation of liquor through percolating filters gave good results but was unsuited to intermittent use. Circulation of liquor through

an aeration tank and continuous aeration of liquor in the retting tank both gave good results. BOD of the liquor (3000 ppm) was only about 50% greater after 40 rets than after one anaerobic ret. Then rate of aeration was adjusted to maintain the pH of the retting bath at 6.5-7.0. Continuous aeration techniques were applied to industrial units with only minor equipment modifications. The quality of flax produced by aerated and anaerobic retting proved to be equal in industrial scale application.

---

(42) "How Huddlesfield Tackles the Treatment of Textile Wastes", H H Goldthorpe. *Synthetics By-Products* 8, 185-9 (1946).

(Leonard Hill Ltd, 17 Stratford Place, London W1, England.)

A description of domestic and textile sewage, chemical sewage, biological treatment, sludge treatment, and press waters.

---

(43) "Industrial Wastes in Connecticut and Their Treatment", Wm Wise. *Sewage Works J* 17, 338-47 (1945).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Copper and chromium exceeding 1 ppm in sewage is detrimental to biological sewage-treatment processes. Nickel and cyanides are also detrimental. Wastes not containing these elements can often be allowed in municipal sewers after proper mixing and equalization. The removal of copper, nickel, zinc, and chromium from metallurgical wastes has been accomplished but is not as yet economical. Fiber can be recovered from paper-mill wastes by save-alls, sedimentation with and without flocculation and chemical treatment. Textile wastes can be improved 60 to 80% by chemical coagulation, usually with lime and iron salts. Oil and grease can be removed by separators, and soluble coolant oils can be treated by combinations of sulfuric acid, alum, ferrous sulfate, and lime. Plating wastes containing copper, chromium, nickel, cadmium, and cyanides can be treated with about 10 lb per 1000 gal of barium sulfide per 400 ppm chromium, and 3 lb of ferrous sulfate plus 3-5 lb of lime per 1000 gal. Occasionally sulfuric acid is added to control pH and liberate cyanide gas.

---

(44) "Stream Pollution Control at Front Royal, Virginia, Rayon Plant", E R Roetman. *Southern Power Ind* 62, No. 8, 86-9 (1944).

(806 Peachtree St, NE, Atlanta 5, Ga.)

Sanitary sewage is screened and passed through an Imhoff tank for removing and digesting the settleable solids (ground screenings will be added to this tank) and then passed through a trickling filter for removing the BOD. Alkaline viscose waste which finds its way into the sewers is neutralized with waste acid and settled. Acid waste, containing about 0.25% sulfuric acid and other impurities, is neutralized with calcium carbonate. Alkaline sulfide waste is passed through a trickling filter, previously worked in with ripe sludge from the Imhoff tank, thus oxidizing sulfides to sulfates. All of the treated effluents are discharged into large settling basins, from which clean effluent is discharged into the Shenandoah River after several hours settling.

---

(45) "Acid Neutralization Plant with Mechanical pH Control", H D Thatcher. *Inst Sewage Purif, J Proc*, 161 (1943).

(34 Cardinal's Walk, Hampton-on-Thames, Middlesex, England.)

A plant operated for the treatment of an industrial waste containing 0.06 to 0.20% sulfuric acid is described. Neutralization is accomplished by addition of milk of lime produced at the plant, and the lime feed is controlled by an antimony-calomel pH-control unit.

(46) "The Role of Chemicals in Industrial Waste Treatment", E F Eldridge. *Water Works Sewerage* 89, 341-6 (1942).

(22 West Maple Street, Chicago 10, Ill.)

Factors that favor chemical treatment of waste are seasonal operation, presence of suspensions, inert or inorganic chemicals or toxic substances. Construction and operation costs are usually lower and operation less exacting than with biological methods. The application of chemical methods to wastes from canneries, paper mills, beet-sugar houses, textiles, slaughter houses, laundries and metal industries is reviewed.

---

(47) "Chemical Precipitation of Kier-Liquor Waste on a Pilot-Plant Scale and Studies on the Use of Return Sludge", Ralph Porges, Robert K Horton and Harold B Gotass. *Sewage Works J* 14, 685-95 (1942).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

The pilot-plant studies confirmed earlier published laboratory results except that filtration of the coagulated wastes on sand beds or vacuum filters seem preferable to settling. Two-stage treatment using the coagulated sludge from the second stage to clarify the waste without chemical treatment in the first stage shows promise in reducing the cost of treating this very concentrated waste (color 2700, alkalinity 14,000, and BOD 2700). An effluent with a color of 400, a BOD of 400, and a pH of 5-7 is produced with a treatment of 20,000 to 30,000 ppm of alum.

---

(48) "Studies in the Treatment of Sewage and Textile Wastes by Recirculating Filtration. II—Domestic Sewage on a Continuous Basis", Robert K Horton, Ralph Proges and Herman Baity. *Sewage Works J* 14, 818-33 (1942).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Some of the fundamental factors underlying the operation of recirculating filters with domestic sewage were studied, i e, treatment rate, recirculating rate, number of recirculations, total time of treatment and dissolved oxygen content of recirculating material. Of these the one of greatest influence is the number of recirculations. Five recirculations gave the maximum purification. If dissolved oxygen is absent in the recirculation, the number of recirculations must be increased. About 2 hours is the economical time limit for the sewage treatment.

---

(49) "Treatment of Trade Waste Waters at Traders' Premises", W Scott and W Foster. *J Inst Sewage Purif*, 186-93 (1942).

(34 Cardinal's Walk, Hampton-on-Thames, Middlesex, England.)

Felt-manufacturing wastes were treated with calcium oxide (7.5 grains/gal) followed by settlement in tanks; the sludge produced was dried on drying beds. Tar-distilling liquors were settled in tanks to eliminate tar and to permit cooling before discharge to sewers. Mercerizing, dyeing and finishing wastes were neutralized with sulfuric acid (with a pH-control recorder with automatic regulation of the quantity of acid), and the resulting liquor was settled in tanks and treated on a percolating filter. Acid wastes from the dyeing and milling of berets were chlorinated with a dilute solution of bleaching powder, neutralized with sodium hydroxide, and the oxygen demand was further reduced by treating the settled liquor on a sand filter.

---

(50) "Waste Treatment at Yale Woolen Mills", E F Eldridge. *Michigan Eng Expt Sta Bull No. 96*, 3-18 (1942).
(Michigan State College of Agriculture and Applied Science, East Lansing, Michigan.)

Report of experimental studies and recommendations for waste treatment at Yale Woolen Mills (pilot-plant studies) indicate that a dosage of 1 lb calcium oxide and 3 lb ferric chloride per 1000

gal of waste gives an average removal of suspended solids of 83.4% and an average BOD removal of 72.4%. Equalization is essential for efficient removal of both. The use of a magnetic filter is suggested to hold back the light floc noticeable at times. Sludge characteristics and pH data are presented. Recommendations and a design for a full-scale treatment plant are given.

---

(51) "Clarifying Liquids, Such as Water Supplies, Sewage and Industrial Wastes", Samuel L Tolman (to The Jeffrey Mfg Co). US Patent 2,266,097, (Dec 16, 1941).

Apparatus and a method of flocculation are described which involve subjecting a liquid flowing through a flocculator to flocculating action in successive states. The liquid is subjected to successive circular motions from an energy source independent of the liquid flow and about horizontal axes and the flow of liquid is confined from one stage to the next substantially along the axis of rotation of the liquid and closely adjacent to such axis.

---

(52) "Biological Processes in Dye-Plant Waste Waters", A Is 'Yurova. *Vodosnabzhenie Sanit Tekh* 16, No. 4, 33-8 (1941).

(Stroiizdat Narkomstroya, Moscow, USSR.)

The two effluents investigated originated in about equal parts from the washery and dye houses. They showed a pH of 7.1 to 9.6, a transparency of 1.5 to 2.8 cm, a BOD of 160-300 mg/l, a dry residue or suspended matter of 722-2912 and 90-320 mg/l, respectively, loss of weight on ignition 34-60 and 48-60%, respectively, chlorine 35-608, nitrogen as ammonia 0-8, nitrogen as nitrite 0.267, and nitrogen as nitrate 1. The author believed that the dyestuffs had no injurious effect on microorganisms. Oxidation of the effluent required 15-21, average 17 days. The BOD test by the nitrate method indicated that the given effluent was unsuitable for the biological process since bacterial activity would be reduced by the high concentration of organic materials and nitrate content.

---

(53) "The Disposal of Textile Wastes with Domestic Sewage", Robert K Horton and Herman G Baity. *Textile Research J* 11, 321-34 (1941).

(Textile Research Journal, 10 E 40th Street, New York 16, N Y.)

Of the many problems arising from combined treatment the most important is the character of sewage reaching the disposal plant. Equalization and regulation of discharge of industrial wastes are necessary to prevent rapid change in environmental conditions for bacteria and other organisms carrying on purification processes. Reduction of waste volume and recovery of by-products should be employed whenever practical. Neutralization, chemical precipitation and aeration may be necessary to lessen the load applied to biological processes. The activated-sludge process and biological filters employing recirculation of the effluent may be used to treat textile-wastes/domestic-sewage mixtures. The activated-sludge process removes color better but is more easily upset by variations in the waste. In general, digester capacity must be increased when treating textile waste with domestic sewage.

---

(54) "Chemical Precipitation of Sulfur-Dye Wastes on a Pilot-Plant Scale", Ralph Porges, Robert K Horton and Harold B Gotaas. *Sewage Works J* 13, 308-17 (1941).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

Alum and acid coagulation were unsatisfactory because of foaming and hydrogen sulfide evolution. Ferric chloride, sulfate and lime-copperas treatments were satisfactory. Rapid mixing with little flocculation gave best results. The sludge settles poorly because of its high concentration, but it filters well and cracks overnight so that it can be removed from beds. Acid treatment of the sludge may recover dye and coagulant.

---

(55) "Textile-Waste Treatment", H B Gotaas. *Sewage Works Eng Munic Sanit* 12, 267-8 (1941).

(Case-Sheppard-Mann Publishing Corp, 24 W 40th Street, New York 18, N Y.)

A general discussion on treatment of textile wastes.

---

(56) "The Treatment and Disposal of Flax-Retting Effluents", A M Munro. *J Council Sci Ind Research* 13, 247-51 (1940).

(Commonwealth Scientific and Industrial Research Organization, 214 Albert St,, E Melbourne C2, Victoria, Australia.)

The chemical composition and BOD of typical waste retting liquors are discussed. The suggested treatment, based on laboratory experiments, is neutralization with lime and mechanical aeration before discharge into a stream.

---

(57) "Purification of Waste Waters from Linen Manufacture", M L Belinskii. *Vodosnabzhenie Sanit Tekh* 15, No. 10-11, 69-73 (1940).

(Stroiizdat Narkomstroya, Moscow, USSR.)

In linen manufacture the slightly contaminated waters from the washers usually do not require purification. The heavily contaminated waters from boiling, washing in boilers, acidification and bleaching (composing approximately 1/3 of all waste waters) are purified with difficulty. The concentrations of materials, such as calcium sulfate, sodium sulfate, sodium carbonate, and sodium chloride, are so high that these waters cannot be used in irrigation fields. Aeration for 9 hours and treatment with concentrated sulfuric acid, 10% hydrochloric acid solution, ferrous sulfate or chlorine failed to effect satisfactory purification. Fermentation of the residue produced a combustible gas containing hydrogen sulfide 0.02, nitrogen 1.48, carbon dioxide 10.40, and oxygen 16.5%.

---

(58) "Waste Water from Hemp Processing", P K Aggeev and A M Kurennova. *Vodosnabzhenie Sanit Tekh* 15, No. 7, 33-6 (1940).

(Stroiizdat Narkomstroya, Moscow, USSR.)

This is a preliminary report on waste-water testing initiated in the hemp industry in Uzbekistan. The situation and peculiarities of single plants are described. Streams of water of varying size are fed into the hemp conditioning tanks, where the water is badly contaminated, and empty without treatment into the Syr Darya, where self-purification occurs.

---

(59) "Precipitation of a Trade-Waste Sewage", C Lumb and J P Barnes. *Inst Sewage Purif, J Proc*, 82-92 (1940).

(34 Cardinal's Walk, Hampton-on-Thames, Middlesex, England.)

Sulfuric acid is the most economical precipitant for sewages with high fat concentration. The optimum pH is about 3.2. This is increased by addition of aluminoferric (1), and 50-100 ppm of (1) effect a considerable saving in sulfuric acid. The aluminum ion must be responsible for the precipitation under these acid conditions. Plant trials confirmed the economy of the combined precipitants, but septicity resulted in hot weather.

---

(60) "Sewage Waters of Linen Combines", M L Belinskii. *Vodosnabzhenie Sanit Tekh* 15, No. 9, 48-54 (1940).

(Stroiizdat Narkomstroya, Moscow, USSR.)

The special problems involved, detailed analyses of the different liquors and methods of treatment are given.

(61) "Studies on the Treatment of Sewage and Textile Wastes by Recirculating Filtration. I. Domestic Sewage on Batch Basis", Ralph Porges, Henry J Miles and Herman G Baity. *Sewage Works J* 12, 957-68 (1940).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Building, Champaign, Ill.)

Sewage was recirculated on a batch basis through a 4-foot filter of 1-3 in stone and efficiencies in BOD removal were studied at varying rates of filtration, BOD loadings, times of contact, and number of recirculations. The ideal rate was 24 mgd. Stronger sewages or heavier loadings required longer period of recirculation. Dissolved oxygen must be present throughout the system at all times.

---

(62) "Dewatering of Activated Sludge Obtained by Treatment of a Sulfur-Dye Sewage Mixture", R Porges and H J Miles. *Public Works* 71, No. 1, 46 (1940).

---

(63) "Some Effects of Sulfur-Dye Waste Upon Sludge Digestion", Ralph Porges, Henry J Miles and Herman G Baity. *Sewage Works J* 12, 601-12 (1940).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Experimental batches of dye waste, activated sludge and ripe sludge were incubated at 82° F in 1-gal digesters. Gas production and variations in solids were determined. The data show that 0.5% of sulfur-black dye waste is detrimental to sludge digestion, dye waste removed by activated sludge is not so detrimental as when the waste is added directly to digestion, the digesting organisms may be acclimated to small quantities of the waste, and, with large quantities of seed sludge, the initial lag of gas production is reduced to a minimum.

---

(64) "The Treatment of Textile Wastes", Robert S Weston. *Sewage Works J* 11, 657-74 (1939).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

The paper begins with a brief description of the processes of bleaching, mercerizing, coloring, sulfur dyeing, printing, and the processing of wool, silk, and rayon. Tables are given showing the chemical characteristics of the textile wastes. The following subtitles are discussed under the general heading of treatment of wastes: equalization of flow, the acid and centrifugal processes for treating wool-scouring wastes, chemical treatment, which is very costly, sludge handling from chemical treatment, and biological treatment on trickling filters, secondary cinder filters, and activated sludge. For a high degree of treatment the biological processes are preferred.

---

(65) "Treatment of Sulfur-Dye Waste by the Activated-Sludge Process. III. Dewatering of Activated Sludge Obtained by Treatment of a Sulfur-Dye Sewage Mixture", Ralph Porges and Henry Miles. *Sewage Works J* 11, 1038-44 (1939).

(Federation of Sewage and Industrial Wastes Association, 325 Illinois Bldg, Champaign, Ill.)

Approximately twice as much (8.4%) ferric chloride was required to condition activated sludge from sewage and dye mixtures as was required with activated sludge from sewage alone. Fresh activated sludge filtered better than sludge stored overnight.

---

(66) "The Purification of Water from the Textile Industry", M Kehren. *Zellwolle, Kunstseide, Seide* 44, 405-8 (1939).

(Industrie Verlag von Hernhaussen KG, Lietzenburger str 39, Berlin W 15, Germany.)

A detailed description of methods of testing and of purification.

(67) "Industrial-Waste Treatment Processes and Plant Design", E F *Eldridge. Mich State Coll Eng Expt Sta Bull No. 82,* (1938).

(Michigan State College of Agriculture and Applied Science, East Lansing, Mich.)

Textile wastes are frequently alkaline. Neutralization with lime or sulfuric acid is best manually controlled. Bleaching of dye wastes may be accomplished by spent bleach liquors or by chlorination. For continuous-flow coagulation a collecting tank is necessary with a capacity of at least 3 hours' waste and provision for sludge removal. An average of 4 lb of lime and 1 lb of ferric chloride is required per 1000 gal with 15-20 min detention, followed by variable times of sedimentation. With hourly flow under 12,000 gal, similar batchwise treatment is more economical. Sludge disposal is achieved by ponding or drying on beds. Combination of these wastes with domestic sewage, unless very minor in proportion, is not advisable.

---

(68) "Textile-Waste Treatment", H G Baity. *Am Dyestuff Reptr* 27, 544-7 (1938).

(Howes Publ Co, Inc, 44 E 23rd Street, New York 10, N Y.)

The primary effects upon receiving streams of textile wastes are 1) toxicity to stream life, 2) oxygen depletion in stream water, and 3) physical impairment of stream conditions. A brief chronological account is given of the interest and work in textile-waste treatment in North Carolina.

---

(69) "Textile-Waste Studies in North Carolina", Henry J Miles and Ralph Porges. *Am Dyestuff Reptr* 27, 736-42 (1938).

(Howes Publ Co, Inc, 44 E 23rd Street, New York 10, N Y.)

In handling wastes alone, chemical precipitation has been used. On mixtures of sewage and waste, chemical precipitation, biological and mechanical filtration and the activated sludge process have been used. A summary of the work of a number of investigators on the subject is given. A description of the Textile Foundation Experimental Plant and the laboratory at Greensboro, N C, and of the tests applied is included.

---

(70) "Treatment of Sulfur-Dye Wastes by the Activated-Sludge Process. II—Further Studies of Optimum Operating Conditions", Henry J Miles and Ralph Porges. *Sewage Works J* 10, 816-67 (1938).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Four 36-gal aeration tanks containing 500, 1500, 2500, and 3500 ppm of suspended activated sludge were operated on 4-, 6-, and 9-hr aeration periods; equal amounts of air and a 1% dye-waste/sewage mixture were used. Aeration for 6 hours was decidedly better than for 4 hrs, but 9 hrs gave only slightly better results. Variations in air and sludge quantities had little effect on the BOD removals. Removals of color were almost directly proportional to sludge concentrations up to 2500-3000 ppm.

---

(71) "High- and Low-Temperature-Digestion Experiments. III—Effect of Certain Organic Wastes", Willem Rudolfs and Lloyd R Setter. *Sewage Works J* 9, 549-68 (1937).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Laboratory experiments were conducted on the digestion of sewage sludge and organic trade wastes at 20 and 50° C, including various tannery, dye, wool, and blood wastes. The thermophilic digestion was less sensitive to the organic wastes. The wastes produced larger amounts of hydrogen sulfide and the ripe-sludge odors were intensified. The drainability of the sludge digested at 50° C was reduced. From 20 to 40% organic matter as wastes could be digested by the ripe sludge but with reduced gas formation.

(72) "Effect of Trade Wastes on High- and Low-Temperature Digestion", Willem Rudolfs. *Ind Eng Chem* 29, 803-4 (1937).

(Am Chemical Society, 1155 16th Street, NW, Washington 6, D C.)

In mesophilic digestion up to 14% of tannery waste did not retard gas production. Blood waste causes foaming, low gas production and odorous sludge. With 10% wool-scouring waste the effect was slight, 20% retarded digestion by 25%. With 10% of rug-dyeing waste gas production was retarded 35%. Even 0.1% of gasoline caused retardation, and 0.5% caused over 80% delay. Radical reduction in digestion is caused by 4 ppm of Na_2AsO_2. Up to 0.025% of copper sulfate had little effect. Except for gasoline the retardation is reduced or overcome by acclimatization, and hydrogen sulfide production is also reduced. Results with thermophilic digestion are similar. Gasoline could be tolerated at 15 ppm in 200 ppm of suspended solids. It is more sensitive to poisons but otherwise produces as much gas in a shorter time without requiring as much acclimatization. In general, addition of trade waste adversely affects dewatering and drying. Odor production increases, particularly in the presence of poisons.

---

(73) "A Survey of Recent Developments in the Treatment of Industrial Wastes", Willem Rudolfs. *Sewage Works J* 9, 998-1014 (1937).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

This survey covers the literature of 1934-6 on the treatment of gas and phenol wastes; dairy, brewery, distillery and fermentation wastes; tannery wastes; meat-packing and cannery wastes; sugar wastes; oil, grease and laundry wastes; textile, dye, paper, and alcohol wastes; mine and pickling wastes; and trade wastes in stream pollution. One hundred and five references.

---

(74) "Purification of Dyehouse Wastes", L Fassina. *Chimie & Industrie* 38, 840-7 (1937).

(28 rue St Dominique, Paris (7e), France.)

A suggested system of purification comprises clarification with a suitable agent (e g, clay, lime, aluminum sulfate, ferric sulfate, etc); decantation and filtration; electrolytic treatment using electrodes that are attacked by the liberated ions (suitably iron or aluminum) and that are in separate chambers; passing through porous material (wood which may have been treated with acid or alkali) to absorb colored impurities. Purification is carried out to the point where, after dilution in the stream into which it is discharged, it is no longer injurious to life, as shown by its effect on minnows.

---

(75) "Industrial Wastes in Willamette Valley", Fred Merryfield. *Civil Eng* 6, 682-4 (1936).

(Amer Society of Civil Eng, 33 W 39th St, New York 18, N Y.)

Tables indicate the strength of industrial wastes from 6 industries: cannery, tannery, packing, woolen, flax and paper mills. The treatment needed in each case requires individual study. Waste from the flax industry may be precipitated with 0.5% lime solution followed by biological filtration. A plant of good design may still be chemically and biologically inadequate.

---

(76) "The Treatment and Disposal of Industrial Wastes", W L Stevenson. *Chem Eng Congr World Power Conf*, Advance Proof No. F7 (1936).

(Supt of Documents, Government Printing Office, Washington 25, D C.)

A general discussion of waste disposal is followed by brief summaries by authorities of present practice on acid mine drainage, by-product coke-oven waste water, and wastes from corn products, cotton textiles, dairy industry, gasworks, grain distilleries, leather tanning, petroleum refinery, pulp mills, vegetable canning and wool scouring.

---

(77) "Recent Trade-Waste Treatment Methods", Willem Rudolfs. *Sewage Works J* 7, 713-26 (1935).

(Federation of Sewage and Industrial Wastes Assoc, 325 Illinois Bldg, Champaign, Ill.)

Literature published during the years 1932-34 on treatment of wastes.

---

(78) "Bleaching and Dyeworks Waste Waters", M S Campbell. *Can Textile J* 51, No. 8, 32 (1934).

(1434 St Catherine St, W, Montreal, Quebec, Canada.)

Waste waters from bleaching and dyeworks are treated by sedimentation, filtration and coagulation. Alum, lime, iron salts and calcium chloride are suitable coagulants. Treatment with 16.7 lb of calcium chloride per 1000 gal is recommended for indigo waste waters, biological treatment for sulfur-dye wastes, and biological filtration for steeping lyes. Sulfur Blue and Direct Black can be removed by chlorine treatment.

---

(79) "Clarification of Waste Waters in Dye Works", Arnold Rhode. *Deutsche Farber-Zeitung* 69, 333-4 (1933).

(H Krumbhaar, Liegnitz, Germany.)

The concentrated dye waste waters and strongly polluted rinsing waters are separated according to the type of dye, decolorized with hydrochloric acid, calcium oxide and chloride of lime in preliminary clarification tanks, and then treated with remaining waste waters in 2 groups of 3-stage filters of brown-coal slag fitted with perforated clay pipes for better aeration.

---

(80) "The Purification of Waste Liquors from Artificial Silk Plants and Mercerization Processes", A Schrobe. *Papierfabr* 24, 297-9 (1926).

(Otto Elsner, Oranienstr 140-42, Berlin S W 68, Germany.)

A brief review of German patents.

---

(81) "Effect of Dye-Manufacturing Waste Upon Sludge Digestion", Willem Rudolfs and I O Lacy. *N J Agr Expt Sta Bull 486*, 20-3 (1929). *US Pub Health Eng Abstracts E-902c*, 96.

(Supt of Documents, US Govt Printing Office, Washington 25, D C.)

A dye-manufacturing waste containing chlorides, sulfates, iron and dye was mixed in proportion to a possible local sewage flow and seeded with domestic sewage sludge. The waste retarded the digestion of the mixture. Due allowance should be made in the design of the digestion capacity of a tank receiving this waste.

---

(82) "Purification of Sewage Containing Large Amounts of Dyestuffs by Activated Sludge", A Pritzkow and Jordan. *Wasser u Gas* 18, 553 (1928). *Wasser u Abwasser* 24, 219 (1928).

(Carl Heymanns Verlag, Mauerstr 44, Berlin W 8, Germany.)

The complete removal of dyes is effected only by repeated filtration through clinker beds. Laboratory experiments indicated that sewage containing dyestuffs was rendered innocuous by treatment with activated-sludge process.

---

(83) "Lime in the Treatment of Dye and Textile Wastes", F D Snell. *Rock Products* 28, No. 18, 61-2 (1925).

(Maclean-Hunter Publishing Corp, 309 West Jackson Blvd, Chicago 6, Ill.)

Description of acid neutralization and coagulation of dye wastes by iron or aluminum sulfate and lime. High calcium lime is preferable to magnesium lime.

(84) Use of Lime in Preventing Stream Pollution", E B Besselievre. *Chem Met Eng* 32, 634-5 (1925).

(McGraw-Hill Publishing Company, 330 West 42nd Street, New York 18, N Y.)

Experience has shown lime to be effective, either alone or with other chemicals, in treating wastes from rubber, leather, textile, paper, sugar, and food-products plants. Continuous removal of sludge, and the use of dry, powdered hydrated lime are advocated.

---

(85) "The Purification of Dyehouse Effluents", Gustav Ullmann. *Textilber* 6, 346-9 (1925).

(Ebertplatz 3, Postfach 181, Heidelberg, Germany.)

After aeration, alkali treatment and rapid filtration, it is suggested that fibrous material, such as straw or leather scrap, be used to clear the water.

---

(86) "Textile Wastes and Stream Pollution", E B Besselievre. *Am Dyestuff Reptr* 13, 743-7 (1924).

(Howes Publishing Co, Inc, 44 East 23rd St, New York 10, N Y.)

Textile-mill wastes cannot be treated successfully by the methods applicable to municipal or domestic sewage because of the differences in composition of the two substances. The treatment of textile-mill waste is not standardized and probably cannot be because of the different substances used in the processes in different factories. Each plant furnishes an independent chemical problem in the disposal of its wastes, and usually this disposal cannot be turned to profit, but must be made to comply with law. A number of examples are given of the treatment of textile wastes under different conditions.

---

(87) "Disposal of Wastes from Dyehouse and Textile Operations", A O True. *J Am Water Works Assoc* 11, 896-903 (1924).

(521 Fifth Avenue, New York 17, N Y.)

The waste discussed consisted of waters containing indigo dye, sodium sulfate, sodium hydroxide, sodium chloride, sodium carbonate, sodium sulfide, and sulfur colors. The color varied, being black, dark blue, and brown at times. The best results in effecting its improvement were obtained by reducing the alkalinity with sulfuric acid, followed by coagulation with alum. Close control is necessary as the quality of the waste is quite variable.

---

(88) "Treatment of Laundry Wastes", F E Daniels. *Public Works* 54, 190-1 (1923).

(Public Works Journal Corp, 310 E 45th St, New York 17, N Y.)

Alkalinity was corrected with sulfuric acid (pH 2.6 for lime or 7.0 for alum), followed by treatment with lime or alum, and, after settling, the clear supernatant liquor was run off. The sludge was dried on beds. Instead of sulfuric acid, iron sulfate may be used with lime, but the detention period is increased. The cost of the acid-alum treatment is lowest.

---

(89) "Wastes from the Textile Industry in Russia", W Droszdorf. *Gesundh Ing* 46, 167-8 (1923).

(Schliessfach 31, Munich 1, Germany.)

Textile wastes are divided into 2 groups: those from wool, fabric, and silk industries, and those from cotton, linen, and hemp industries. The wastes from the first group contain dyes, organic nitrogenous material, and pathogenic bacteria. Those from the second group contain organic matter, a small amount of organic nitrogenous material, ammonia, and suspended matter in small concentrations, with no dissolved poisons. These wastes can be purified by the usual chemical means: lime and ferrous sulfate; combined chemical and mechanical means, etc. Biological means, however, offer the only method of complete purification. Recent investigations point to excellent results along this line.

(90) "Constitution and Purification of Waste Waters from the Flax-Retting Industry", S Stoof. *Gesundh-Ing* 46, 16-23 (1923).

(Schliessfach 31, Munich 1, Germany.)

Various means of purification, both chemical and biological, are discussed.

---

(91) "Observations on Textile Efficiencies", E V Chambers. *Am Dyestuff Reptr* 11, 127-9 (1922).

(Howes Publishing Co, Inc, 44 E 23rd St, New York 10, N Y.)

A discussion of power-plant efficiency, fiber, oil, and grease recovery, and treatment of waste and refuse.

---

(92) "Acid Treatment of Wool-Scouring Wastes", H M Ladell. *Public Works* 53, 90 (1922).

(Public Works Journal Corp, 310 E 45th St, New York 17, N Y.)

Acid is added in tanks containing 3 times the daily flow. One gallon acid is used per 250 gallons suds.

---

(93) "Preventing Dye-Waste Pollution of Streams", Report US Public Health Service. *Public Works* 48, 250-1 (1920).

(Public Works Journal Corp, 310 E 45th St, New York 17, N Y.)

The treatment of liquid wastes from dye works was studied at the Chemical Co plant, Springfield, N J. Details of the tests are given. It was recommended that wastes and wash water be mixed, except those of the "direct green" series of dyes, that ferrous salt be added in a wood vat, also sufficient slaked lime to neutralize the acid and to give in addition 8 lb per lb of iron; followed by filtration through a sand filter bed or other suitable medium and dilution of the effluent with at least 5 times its volume of water.

---

(94) "Disposal and Purification of Factory Wastes or Manufacturing Sewage", H W Clark. *41st Ann Rept Mass State Board of Health*, 1-67 (1910).

Difficulties in industrial-waste purification in general are outlined. Treatment of tannery wastes with calcium hydroxide followed by sand filtration is effective; preliminary straining through coke is also advantageous. Arsenic and 85% of crude organic matter are removed in the coke. Treatment in trickling filters followed by sand filtration also gave good results. Wool-scouring wastes can be successfully treated by intermittent filtrations only when mixed with large amounts of domestic sewage. Use of common chemical precipitants, even in large amounts, was a failure. Paper-mill wastes were most satisfactorily treated by passing the combined effluents through coke or similar strainers at a rapid rate. Wastes containing dyes were treated for color removal in intermittent sand filters; continued application lessened the efficiency, however. Practically all colored matter was coagulated and removed by adding calcium hydroxide and ferric chloride in amount not over 1 ton/mg treated. Results are given in somewhat less detail for application of intermittent sand filtration to treatment of wastes from creameries, yeast factories, gas works, glue factories, and paint mills.

---

(95) "Biological Treatment of Wastes", Clair N Sawyer.

(Mass Institute of Technology, Cambridge, Mass.)

The biological treatment of wastes from textile, brewing, and tanning industries is a research project of MIT. Cotton-kier (alkaline-bleaching) waste is also being examined.

---

(96) "The Use of Copper Sulfate in Water-Treatment Plants."

(Tennessee Corporation, Atlanta 1, Georgia.)

The authors suggest that copper sulfate is useful and economical in controlling algae and other microscopic organisms in

water supplies. Copper sulfate will remove about 90% of the organisms leaving only 10% to be controlled by chlorination or other means, and it is a very useful adjunct in the control of taste and odor. A concentration of 0.5 to 1.0 ppm is discussed, and it is claimed that the presence of this much chemical has no harmful effects and in some instances is actually an aid to health. The use of copper sulfate in sewers is also mentioned.

---

(97) "The Use of Lime in Industrial-Waste Treatment", Booklet #1.

(National Lime Association.)

In this booklet, various industrial wastes are discussed, and the use of lime in treating these wastes is brought out. There are two tables in the booklet devoted to rayon wastes and textile wastes, describing the types of waste, their character, chemical composition, and methods of treatment. The total waste tabulation is broken down into the following headings: deterging, bleaching, dyeing, and miscellaneous. The pamphlet is a bibliography of the waste from various industries.

---

(98) "Treatment of Raw and Waste Waters", Bulletin 52-19.

(Philadelphia Quartz Co, Public Ledger Building, Independence Square, Philadelphia 6, Pa.)

This bulletin deals largely with the use of activated silica sols for the treatment of raw water. It describes the process of coagulation with silica sols for water high in color with unusually high or low turbidity. Preparation of silica sols by reacting sodium silicate with acid salts and inorganic acids is described. A chart is part of the bulletin, showing how to prepare activated silica sol with various common inorganic chemicals. The bulletin entitled "Activated Silica, A New Chemical Engineering Tool" discusses the production of various silica sols, and describes the method for introducing same into either a raw water or effluent water system.

B With By-Product Recovery

(1) "Conservation and Recovery of Chemicals Used in Viscose Spinning Baths and Processing Liquors", Donald Entwistle, Horace J Hegan and Edwin H Sharples (to Courtalds Ltd). British Patent 678,462, September 3, 1952.

Zinc is recovered from viscose processing liquors containing sulfuric acid and small quantities of zinc sulfate, by neutralizing the acid, adding sufficient alkali to precipitate the zinc as hydroxide, and treating with sulfuric acid to form fresh zinc sulfate for reuse in the process. With sodium hydroxide as the alkali, neutralization and precipitation may be carried out as a single operation. When calcium oxide or calcium carbonate is used to neutralize the acid, the lime sludge is settled, the neutral liquor is separated, and the zinc hydroxide is precipitated with sodium hydroxide. The pH of the precipitating solution must not be above 12 to avoid resolution and loss of zinc. The recovery process may be carried out as a batch or continuous operation. Iron impurities in the zinc sulfate solution are removed by oxidizing the ferrous salts to ferric salts and adding zinc hydroxide to precipitate the iron as ferric hydroxide, which is then removed by setttling or filtration.

---

(2) "Absorbents in Waste-Water Treatment—Dye Absorption and Recovery Studies", H A Thornton and J R Moore. *Sewage and Ind Wastes* 23, 497-504 (1951).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

The capacity of fuller's earth and activated bauxite for removal of dyes from waste waters was investigated. Economical use of these materials will require regeneration and reuse. It was found that burning satisfactorily regenerated materials when nonmetallic dyes were used. Regeneration of the absorbent and recovery of dye by means of solvents was found feasible for some dyes.

---

(3) "Sewage and Industrial Waste Treatment—1950", R E Fuhrman. *Water and Sewage Works* 98, 47-59 (1951).

(22 West Maple Street, Chicago 10, Ill.)

A good general review of the subject, concentrating on work done in 1950.

---

(4) "Chemical Engineering Aspects of Industrial Wastes Control", C F Gurnham. *Sewage Ind Wastes* 28, 82-88 (1951).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A general article citing several processes and operations in the treatment of industrial wastes.

---

(5) "Recovery of Grease from Wool-Scouring Wastes and Abatement of Stream Pollution through the Calcium Hypochlorite Process", A A Cameron. *Am Dyestuff Reptr* 39, 667-668 (1950).

(Howes Publishing Co, Inc, 44 E 23rd St, New York 10, N Y.)

Waste water is collected in a sump pit and pumped into an aeration tank. It is treated with 6-7% calcium hypochlorite and allowed to settle in three 15,000-gal tanks for 8 hours. pH before treatment, 8-11; after, 7-8. Grease and sludge are precipitated, and the clear liquor is decanted into a stream. The sludge is pumped to 3 other settling tanks and treated with sulfuric acid to pH 4.5. Another settling tank process follows, and the clear effluent is decanted into the stream. The sludge is heated, pumped to blowdown tank, then forced through sperry filter presses. Under ideal conditions, 90% of BOD is removed before effluent is emptied into stream.

---

(6) "An Inquiry into the Possibility of Utilization or Hygienic Disposal of Textile Wastes; Chemical Precipitation of Kier and Dye Wastes", C V Sabnis. *Indian J Med Research* 38, 357-68 (1950).

(23 Samavaya Mansions, Corporation Place, Calcutta 13, India.)

Lime, iron salts, calcium chloride, and alum were used as clarification agents with a view to possible reuse or recovery of the chemical constituents of kier liquors and dye wastes. Filtration experiments employing sand, charcoal, lime, and gypsum were included as well as aeration of the waste liquors. Results so far obtained show that it would be cheaper to dispose of such wastes in a hygienic way rather than reclaim them.

---

(7) "Recovering Wool Grease from Wool-Washing Waste Liquor", Toshi Kinoshita, K Kitsuts (to Oriental Textiles Co). Japanese Patent 859, Mar 31, 1950.

An apparatus.

---

(8) "Industrial-Waste Disposal—Treatment and Utilization of Textile Wastes", S Balasundaram and V Subrahmanyan. *Science Culture* 15, 277-279 (1950).

(Indian Science News Assoc, 92 Upper Circular Rd, Calcutta 9, India.)

Textile wastes are collected in a sump pit, mixed, and allowed to neutralize partially. The mixture is pumped into reaction tanks, treated with 448 lb gypsum per 100,000 gal liquid, aerated one-half hour, and settled three hours. The sludge is removed to a sludge well and dried on a sand bed for use as fertilizer. The clear waste liquid flows to a reservoir, then is pumped to sewer.

(9) "Textile Trade Effluents and Their Treatments", L Klein. *J Textile Inst* 40, 1097-1105 (1949).

(The Textile Inst, 10 Blackfriars St, Manchester 3, England.)

A lecture on polluting chemicals and their effects on rivers; standards for trade wastes; general methods of treatment; and methods of treating wastes for wool scouring, mercerizing, kier liquors, cotton dyeing, bleaching, printing and viscose rayon manufacture.

---

(10) "Controlling Stream Pollution", G W Reid. *Sou Power and Ind* 66, 80-81, 114 (1948).

(806 Peachtree St, NE, Atlanta 5, Ga.)

A general article citing waste recovery and sale of by-products. Unrecovered wastes are discussed with no suggestions made for removal. A table of BOD of various wastes at concentrations of 250 ppm is given. Some discussion of pending legislation.

---

(11) "The Hypochlorite Process for Treatment of Wool-Scouring Wastes and Recovery of Wool Grease", H A Faber. *Sewage Works* 19, 248 (1947).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Average analysis of scouring wastes in ppm is as follows: grease, 8,500; suspended solids, 11,500; alkalinity, 6,700; OC, 1,800; BOD, 6,000; and nitrogen, 1000. The methods of treating wool wastes are reviewed. The hypochlorite process has been most successful and consists of treating the wastes with calcium hypochlorite and aerating. This separates the greases and soaps from the liquid in large curds. After settling, the clear supernatant is sewered. The sludge is acidified to pH 4.0-5.0 and a further separation of grease and water is caused by the liberated chlorine gas. The sludge is heated, and grease is removed by pressing. The cake may be disposed of on land and is dried without odor.

---

(12) "Some Future Problems in Sewage Purification at Bradford (England)", C C Beedham. *Surveyor* 106, 611-615 (1947).

(Carlisle House, 8 Southampton Row, London W C1, England.)

The sewage treated in Bradford is primarily effluent from the wool scouring and dyeing industry. The emulsified liquor has an oxygen demand of 6,000 ppm, and contains 3,000-30,000 ppm grease, which is separated by treatment with sulfuric acid to pH 3.5. However, the best liquor for biological treatment has a pH of 6.0 to 6.5. By acidifying only the strong, grease-containing effluents, acid is saved and the filter feed has a higher pH. Effluents containing synthetic detergents must be mixed with weak sewage to effect precipitation.

---

(13) "Industrial Wastes. Textile Industry", J C Geyer. *Ind Eng Chem* 39, 653 (1947).

(American Chemical Society, 1155 16th St, NW, Washington 6, D C.)

Deterging wastes, such as those from wool scouring, cotton kiering, silk degumming and others are highly polluting. Dye wastes, except sulfurs and vats, are only a little more polluting than domestic sewage. Sulfur and vat dyes are in strongly alkaline reducing baths. Some reuse of water is possible and in special cases chemicals are recovered. Averaging must be for 24 hours because of the variability of the wastes. Coagulants are then used, with ferrous sulfate and lime most economical. If under 0.3 mgd, batch treatment may economically replace continuous operation. Sludge is lagooned or dried on sand beds. The precipitated and settled liquor may be filtered or chlorinated. Combination with domestic sewage is simplest and lowest in cost.

(14) "Wool-Scouring Wastes Treated by New Chemical Process", R A Faber and P F Howard. *Water & Sewage Works* 93, 467 (1946).

(22 West Maple Street, Chicago 10, Ill.)

The hypochlorite method consists of mixing, aerating, then settling the waste with an amount of calcium hypochlorite about equal to the alkali in the scour. This oxidizes organic matter and permits separation of sludge containing calcium carbonate and insoluble soaps. The clear supernatant is discharged. Sludge and scum are concentrated by acidification with sulfuric acid, and the supernatant is discharged. Sludge is heated and pressed, yielding a cake which dries readily, and a grease-water mixture which is separated in a gravity separator. The grease is concentrated, steamed, and acidified. This process removes 98% of grease from water; 75% is recovered and sold. The plant installation at Abbot Worsted Co, Forge Village, Mass, is described.

---

(15) "Treatment of Trade Effluents for Discharge and By-Product Recovery", H Robinson. *Ind Fibres, Synthetic By-Products* 7, 257-64 (1945).

(Leonard Hill Ltd, 17 Stratford Place, London W1, England.)

Analysis for detection of pollution, reagents for chemical precipitation, purification by lagoon exposure, treatment of waste waters from chemical industries dealing with pigments, salts, acids, and alkalies, recovery of copper from pickling liquors by addition of scrap iron, water pollution in gas, coke, tar, and petroleum industries, textile effluents, paper-mill waste products, and effluents from the food-processing industries are discussed.

---

(16) "The Purification of Waste Waters and the Recovery of Lanolin from the Washing of Wool", L G Leites. *Sherstyanoe Delo* 18, No. 8, 13-15 (1939).

(Main Wool Board of the Narkomlegprom, Ul Razina N 9, Moscow, USSR.)

The clarification of the waste water and the recovery of the lanolin by the use of calcium chloride are described. The calcium soap contains all of the fat together with the dirt and is filtered off. The lanolin is recovered from the dried filter cake by extraction with benzene.

---

(17) "Purification of Waste Water from Wool Washing with Recovery of Fat", S N Cherinskii and L G Leites. *Vodosnabzhenie Sanit Tekh* 14, No. 11-12, 76 (1939).

(Stroiizdat Narkomstroya, Moscow, USSR.)

The waste water from wool washing is contaminated with potassium salts of various organic acids, lanolin, etc. Known methods of recovery of these are described. A new method that has been found satisfactory is treatment of the waste water with calcium chloride (10 g/l) and calcium oxide (10 g/l), filtration, biological purification of the filtrate, and extraction of the residue with benzene.

---

(18) "Waste Water of Dye Works", E T Ellis. *Dyer and Calico Printer* 55, 32-3 (1926).

(Heywood & Co, Ltd, Drury House, Russell St, Drury Lane, London WC2, England.)

Purification of the water and the recovery of the values contained.

---

(19) "Clarification of Wool Scourers' Effluent and Recovery of Wool Fats", Jean De Raeve. *Ind Eng Chem* 17, 837-8 (1925).

(American Chemical Society, 1155 16th St, NW, Washington 6, D C.)

The effluent is agitated with steam in a vat and 1 lb of

calcium hydroxide in 1 gal water is added to every 100 gallons effluent. The mixture is filtered and chlorine is added to the filtrate as determined by titration of the alkali. The chlorinated waters are titrated with sulfuric acid to determine the amount needed to change the hypochlorites into hypochlorous acid. After addition of the acid the fats rise to the surface and are skimmed off. The white foam containing grease, which forms during chlorination, is added to the fats, and the mixture is heated and filtered.

---

(20) "The Treatment of Waste Waters from Dyeing Processes", S N Brown. *J Soc Dyers Colourists* 40, 144-7 (1924).

(32-34 Piccadilly, Bradford, Yorkshire, England.)

A brief review of the methods of treating waste waters for the recovery of tin, arsenates and phosphates, alizarin, indigo, and fibers. The treatment of water containing sodium sulfide is discussed.

---

(21) "Treating Wool-Scour Waters", A J DeRaeve. US Patent 1,543,324, June 23.

Waster waters from wool scouring are treated wih sufficient lime to convert the sodium carbonate present into sodium hydroxide and precipitate calcium carbonate. The mass is heated to the boiling point while fresh, the sludge is separated from the liquor, and the liquor is treated at a temperature below 35° C with chlorine equivalent to the alkali present, thereby producing chloroprotein and alkali hypochlorites. The latter are neutralized with acid, and the floated fats are separated.

IV LEGAL REQUIREMENTS

(1) "National Water Resources Policy as Related to Stream Pollution", L R Howson. *Sewage and Ind Wastes* 24, 222-227 (1952).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A critical review of the report of the President's Water Resources Policy Commission.

---

(2) State of Maryland Water Pollution Control Law—1952.

(Water Pollution Control Commission, 2114 No Charles St, Baltimore 18, Maryland.)

This law designates a Water-Pollution Control Commission, composed of seven members. Its duties are to study, investigate, and recommend ways and means of eliminating materials which pollute or tend to pollute the waters of the state of Maryland.

The law includes penalties for violation, means for aggrieved persons to appear against orders of the Commission, and other similar sections.

There are three active sections in the law: the first, dealing with the discharge of oil upon the waters within the jurisdiction of the state of Maryland; the second, dealing with the disposal of garbage and food; and the third, dealing with industrial wastes.

---

(3) "Determination of Fair Sewage Service Charges for Industrial Wastes", G J Schroepfer. *Sewage Ind Wastes* 23, 1493-1515 (1951).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

An excellent review article citing methods devised by the Association of American Civil Engineers and the American Bar Association for computing fair rates of charge for treatment of industrial wastes that are acceptable for discharge into municipal sewage-treatment facilities.

---

(4) "Water Pollution by Industry. A Survey of State Legislation and Regulations", D F Othmer, M D Weiss, R S Aries. *Mechanical Eng* 73, 706-708 (1951).

(Am Society of Mech Eng, 29 W 39th St, New York 18, N Y.)

Pollution is defined, and the public policies of states relating to pollution are summarized. States are showing a more realistic approach to pollution control problems, and industry is showing a desire to co-operate. The federal government is taking an active hand by advising local governments, thus putting the problem on a more unified national basis.

(5) State of Maryland Water-Pollution Control Commission Biennial Report for the Fiscal Years 1950-51.

(Water-Pollution Control Commission, 2114 No Charles St, Baltimore 18, Maryland.)

This report goes into the development of water pollution and methods for its control in Maryland. It describes the activities of the Commission and reviews the reports from the different districts in the state. The specifications for industrial wastes as outlined in the law and the analytical procedures for water analysis are given in detail. These methods follow "Standard Methods for the Examination of Water and Sewage", 9th edition (1946), published by the American Public Health Association.

The report also includes the Water Pollution Control law, as enacted in 1947 and amended in 1951. (This law has been changed by an amendment made in 1952.)

---

(6) "Some Legal Aspects of Stream Pollution Control", J R Haffert. *Ind Hyg Foundation, Trans of the Legal Conference, 15th Annual Meeting, Transactions Bulletin #16*, 1-21 (1950).

(Industrial Foundation of America, 4400 5th Ave, Pittsburgh 13, Pa.)

A general discussion of legal aspects of stream pollution.

---

(7) "Standards of Stream Pollution", H W Streeter. *Sewage Works J* 21, 115-126 (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Tabulations show types of standards in 45 states and recommended quality standards in four large water basins. Waters are classified as excellent, desirable, doubtful, unsuitable. The limits of coliform per ml, dissolved oxygen, BOD, pH, and phenol content are given.

---

(8) "Pollution Abatement. Appraisal of Current Regulations", A Anable and R P Kite. *Chem Eng Progress* 44, No. 1, Trans Am Inst Chem Engrs 3-16 (1948).

(Am Inst of Chem Eng, 120 E 41st St, New York 17, N Y.)

The paper establishes the factual background for all stream pollution legislation in the US, its Territories, and Canada for plant personnel faced with disposal-correction problems.

---

(9) "Trade Effluents. A Summary of the Legal Position", L F Stemp. *Gas J* 256, 157-158 (1948).

(Walter King, Ltd, 11 Bolt Court, Fleet Street, London EC4, England.)

A summary of the English Public-Health (drainage of premises) Act of 1937, passed to cope with the problems of disposal of industrial waste into city sewers.

(10) "Legal Indexes of Stream Pollution", D E Bloodgood. *Sewage Works J* 21, 711-716 (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A discussion of the legal loading of steams by industrial operations.

(11) "Clean Water is Everybody's Business". Public Health Service, Publication No. 11.

This pamphlet presents in elementary terms and pictorial form the case history of many cases of stream pollution and suggests formal ways in which government control can be applied to correct the situation.

V ECONOMICS OF TREATMENT AND DISPOSAL

A Financing Industrial Treatment and Disposal Systems

(1) "Waste Treatment Cost Need Not Be Excessive", Wendell B Goode. *Textile World* 100, 100 (1950).

(McGraw-Hill Publishing Co, 330 W 42nd St, New York 18, N Y.)

This article discusses the treatment and cost of treatment of wool-finishing waste, which includes waste from the following processes: dry cleaning, carbonizing, washing, fulling, continuous scouring, and dyeing. The layout of the waste-disposal system is discussed in some detail and diagrammed. An analysis sheet showing the chemical composition of two composite waste samples before and after treatment is given. The operation of the treatment plant is discussed, and a sample control sheet shown with a breakdown of the cost of treatment for 8.5 million gallons.

---

(2) "Comparison of Methods for Treatment of Wool-Scouring Wastes", S E Coburn. *Sewage Works J* 21, 84-90 (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Comparative data are given on the efficiency of three methods of treating wool scouring wastes: acid cracking, calcium hypochlorite, and calcium chloride plus carbon dioxide. Percent removals are:

	Acid	Hypochlorite	Chloride-Carbon Dioxide
Suspended Solids	87.5	96.2	99.2
Fats	77.1	86.0	89.6
5 day BOD	48.6	42.2	58.9
Chemical cost/1000 lb	$ 0.77	$ 2.12	$ 1.65

The effluents tested contained BOD of 1000-2000 ppm and would require treatment in high-rate filters to reduce them to normal sewage strengths.

---

(3) "Organization and Method for Investigating Waste in Relation to Water Pollution". Manual Sheet W-1 (1948).

(Manufacturing Chemists' Association, Inc, 246 Woodard Building, Washington 5, D C.)

A description of the organization of a program for investigating water pollution and the administration of such a program. Several points to be followed in engineering design involving waste pollution in regard to new plants and enlarging existing plants are discussed. Eighteen points are listed for a plant to follow if it is to undertake an economical and successful study of water pollution.

---

(4) "A Report of Procedure for the Handling of Industrial Wastes, 1945 Committee on Industrial Wastes, California Sewage Works Association", W T Knowland, et al. *Sewage Works J* 18, 503-26 (1946).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

This report discusses in detail the effect of industrial wastes on sewers, treatment-plant operation, costs of operation and the interest in their effect on management of industry, operators of sewage plants, sanitary engineers, local government agencies, chambers of commerce and state agencies. Various formulas for computing rates of charge are discussed, but emphasis is made that such formulas apply only to individual cases and cannot be generally applied.

B Municipal Sewer Rental Systems

(1) "Determination of Fair Sewage-Service Charges for Industrial Wastes", T M Niles. *Sewage Ind Wastes* 24, 211-221 (1952).

(Federation of Sewage and Industrial Wastes Association, 325 Illinois Bldg, Champaign, Ill.)

A discussion of the factors influencing charges made to industries for sewer usage for waste disposal, with applications of proposals made to specific problems.

---

(2) "Determination of Fair Sewage-Service Charge for Industrial Wastes", G J Schroepfer. *Sewage Ind Wastes* 23, 1493-1515 (1951).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

An excellent review article citing methods devised by the Association of American Civil Engineers and the American Bar Association for computing fair rates of charge for treatment of industrial wastes acceptable for discharge into municipal sewage-treatment facilities.

VI INDUSTRIAL WASTE CONTROL, GENERAL

A Water-Pollution Control, General Discussion

(1) "Industrial Water-Pollution Abatement", Roy F Weston. *Chem Eng News* 31, 134-8 (1953).

(American Chemical Society, 1155 16th St, NW, Washington 6, D C.)

A discussion of the methods of attack on water-pollution problems by a company or industry to provide adequate water supplies, prevent unfavorable publicity, aid good public relations, and prevent violation of pollution laws.

---

(2) "Symposium on Stream Pollution", E A Leonard, Chairman. *Am Dyestuff Reptr* 42, 651 (1953).

(Howes Publishing Co, Inc, 44 E 23rd St, New York 10, N Y.)

A national AATCC Stream-Pollution-Abatement Committee has been established to help the textile wet-processing industry col-

lect necessary and helpful technical information on their waste problems. Theme: today regulatory measures are relatively few and exploratory or tentative in type. In coming years regulations on water purity must become more widespread and stringent. Growing industrialization and growing populations require increasing amounts of water. The total amount of water is not unlimited and is reduced by exactly the extent to which it is polluted so as to be unavailable for use. Wastes of all types must undergo careful study to determine methods and costs of treatment.

---

(3) "Public Law 845 and Co-operation Between Federal Government and Industry", Louis F Warrick. *Am Dyestuff Reptr* 42, 652-55 (1953).

(Howes Publishing Co, Inc, 44 E 23rd St, New York 10, N Y.)

Public Law 845 clearly states that as a policy of Congress the primary responsibility for the control of water pollution rests with the state. The Federal Government only has a responsibility when it affects the public health or the natural resources of the nation.

There is a co-operative program being carried out with the states, interstate agencies, industries, and others who are concerned with conserving the quality of water resources. This co-operative program is to try to increase the exchange of fundamental information, to reduce duplication of effort and expense of technical work, and, in general, to increase the understanding of the potentialities of stream improvement in a way that will be beneficial to industry and government alike.

---

(4) "Glossary on Waste Treatment and Stream Pollution", William Stafford, Chairman. *Am Dyestuff Reptr* 42, 695-706 (1953).

(Howes Publishing Co, Inc, 44 E 23rd St, New York 10, N Y.)

This is a glossary on waste treatment and stream pollution prepared by the Rhode Island Sectional Stream-Pollution Committee, AATCC.

---

(5) "In-Plant Process Control for the Reduction of Wastes", R H Souther. *Am Dyestuff Reptr* 42, 656-8 (1953).

(Howes Publishing Co, Inc, 44 E 23rd St, New York 10, N Y.)

The textile industry long ago recognized importance of the proper use of water and its return to the stream in good condition for others to use. In 1920 research was conducted at Cone Mills leading to the first use of calcium chloride for treating sulfur and indigo dye wastes. Later researches of the Textile Foundation at Print Works Plant are discussed. Data are given on the layout of an activated-sludge plant for the treatment of sewage and textile wastes, and the necessity for stabilizing pH. The development of the Con-Mil Redox Method led to less waste of chemicals and big savings in cost in vat-dyeing operations. The minimum use of sodium sulfide in dyeing results in lower waste treatment costs with no loss in quality. Trickling filters and a rocky stream bed have also been found to reduce the biochemical oxygen demand of waste greatly at a very low cost. The need for further studies in all processes, such as the use of low BOD detergents and sizing chemicals was brought out in the discussion. The textile industry, like others, can obtain greatest benefits from research to reduce the amount of chemicals put into waste at the source in the plant.

---

(6) "Activities of the American Association of Textile Chemists and Colorists National Stream-Pollution Committee", Percival Theel, Chairman. *Am Dyestuff Reptr* 42, 659-60 (1953).

(Howes Publishing Co, Inc, 44 E 23rd St, New York 10, N Y.)

The AATCC has set up stream-pollution committees, both national and sectional. These committees shall concern themselves with industrial wastes from textile mills. It is their purpose to facilitate the exchange of information; to encourage, inspire, and promote technical investigations on specific problems; to co-operate with the National Technical Task Committee on Industrial Wastes; to study new methods for examination of textile wastes; to re-examine old methods; to publish case histories; and to study specific chemicals used in textile manufacturing as related to pollution.

---

(7) "Pollution Control Through the Mechanism of Classes and Standards", Anselmo F Dappert. *Sewage Ind Wastes* 24, 313-21 (1952).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A discussion is given for standardizing and classifying streams for purposes of sewage and industrial waste disposal.

---

(8) "Critical Review of the Literature of 1951", W Rudolfs, et al. *Sewage Ind Wastes* 24, 541-641 (1952).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A critical review of the literature of 1951 on sewage, waste treatment and water pollution.

---

(9) "Study of Stream Pollution by Wool-Scouring Liquors". *Bull Lowell Tech Inst* 54, 2 (1950-52).

(Lowell Technological Institute, Lowell, Mass.)

The project of examination of the manner and extent to which wool-scouring liquors contribute to stream pollution was assigned by the Mass Dept of Public Health to the Lowell Technological Institute. The study of process control, biological digestions, etc are part of the assignment.

---

(10) "Water-Pollution Control", William S Wise. *Chem Eng News* 29, 5120 (1951).

(Am Chem Soc, 1155 16th St, NW, Washington 6, D C.)

The author discusses the philosophy of water-pollution control, some of the difficulties encountered, costs, etc, based on his experience in Connecticut. He discusses the part that research plays in waste treatment and cites the progress that industrial management has made through a co-operative and constructive attitude toward the waste problems and its work through trade associations and industrial organizations. He discusses the need for an impartial public agency to administer a water-pollution control program which would consider the rights and interests of all concerned, and closes with a plea for co-operation.

---

(11) "State of Maryland Water-Pollution Control Commission Biennial Report for the Fiscal Years 1950-51".

(Water-Pollution Control Commission, 2114 No Charles St, Baltimore 18, Maryland.)

This report deals with the development of water pollution and methods for its control in Maryland. It describes the activities of the Commission and reviews the reports from the different districts in the state. The specifications for industrial wastes as outlined in the law and the analytical procedures for water analysis are given in detail. These methods follow "Standard Methods for the Examination of Water and Sewage", 9th edition, (1946), published by the American Public Health Association.

The report also includes the Water-Pollution Control law, as enacted in 1947 and amended in 1951. (This law has been changed by an amendment made in 1952.)

---

(12) "A Critical Review of Literature of 1950 on Sewage-Waste Treatment and Water Pollution", W Rudolfs et al. *Sewage Ind Wastes* 23, 451-464 (1951).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg., Champaign, Ill.)

A literature survey is included in the annual report of the

Committee on Research, Section A, Federation of Sewage and Industrial-Wastes Associations.

---

(13) "Pollution Control". *Chem Eng* 58, No. 5, 111-158 (1951).

(McGraw-Hill Pub Co, Inc, 330 W 42nd St, New York 18, N Y.)

A general study of pollution in streams and control of same.

---

(14) "Sewage and Industrial Waste Treatment—1950", R E Fuhrman. *Water Sewage Works* 98, 47-59 (1951).

(22 West Maple Street, Chicago 10, Ill.)

A good general review of the subject, concentrating on work done in 1950.

---

(15) "Critical Review of Literature on the Toxicity of Industrial Wastes and Their Components on Fish", P Doudoroff and M Katz. *Sewage Ind Wastes* 22, 1432-1458 (1950).

(Federation of Sewage and Industrial-Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A general review as suggested by the title, citing 126 references.

---

(16) "Review on Toxic Materials Affecting Sewage Treatment Processes—Stream and BOD Determinations", W Rudolfs et al. *Sewage Ind Wastes* 22, 1157-1191 (1950).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

Effects of organic and inorganic wastes on aerobic and anaerobic digestion of sewage, on the natural purification of streams, on the micro flora and fauna of streams, and on BOD tests. 177 references.

---

(17) "The Textile Industry and Stream Pollution", J A McCarthy. *Am Dyestuff Reptr* 39, 752 (1950).

(Howes Publishing Co, Inc, 44 E 23rd St, New York 10, N Y.)

The author discusses the classification of polluted streams and the various programs established by states leading to classification. Included is a discussion of the manner in which streams tolerate a certain amount of pollution and means by which the textile industry may proceed to eliminate, or reduce pollution.

---

(18) "Federal Industrial Pollution Studies", H H Black. *Sewage Ind Wastes* 22, 1049 (1950).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

The research programs being carried on by industry, the Environmental Health Center (USPHS), the Water-Pollution Control-Act appropriations and the National Institute of Health grants are described.

---

(19) "Stream Pollution Control Activities of Industrial Associations", W H Wisely. *Sewage Works J* 21, 51-62 (1949).

(Federation of Sewage and Industrial-Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

The work of various industrial associations to abate stream pollution is cited. The textile, brewing, canning, citrus, fish-canning, chemical, dairy, electroplating, pulp and paper, steel, tanning, and wine industries are included.

(20) "Critical Review of the Literature of 1948", W Rudolfs. *Sewage Works J* 21, 228-67 (1949).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A critical review of the literature of 1948 on sewage and waste treatment and stream pollution. This annual review covers 287 references, largely from US and British sources, also from a few continental journals.

---

(21) "Critical Review of the Literature of 1947", W Rudolfs. *Sewage Works J* 20, 224-72 (1948).

(Federation of Sewage and Industrial-Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A critical review of the literature of 1947 on sewage and waste treatment and stream pollution. 295 references.

---

(22) "Influence of Wastes on Treatment and Use of Water", C F Hauck. *Chem Eng Progress* 43, No. 9, Trans Am Inst Chem Engrs, 481 (1947).

A discussion of the manner and extent that industrial waste-pollution creates or aggravates water-use problems for the communities or plants dependent thereon.

---

(23) "Water Quality and Pollution Control in Western Pennsylvania", C H Young. *J Am Water Works Assoc* 38, 511-24 (1946).

(521 5th Ave, New York 17, N Y.)

Pollution by sewage, industrial wastes and mine drainage occurs in the major streams and many tributaries. A clean-up program is suggested, stressing in order of importance, sewage treatment, controls over discharge of taste and odor-producing waters, and industrial wastes, mine sealing, wider use of selective flow and treatment of industrial wastes.

---

(24) "Critical Review of Literature for 1945", W Rudolfs. *Sewage Works J* 18, 244-83 (1946).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A critical review of the literature of 1945 on sewage and waste treatment and stream pollution. This annual review of the literature covers 230 references mostly in English and American journals. Because of the War there were few foreign journals available.

---

(25) "Critical Review of the Literature of 1944", H Heukelekian. *Sewage Works J* 17, 223-68 (1945).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A critical review of the literature of 1944 on sewage and waste treatment and stream pollution. This annual review of the literature covers 222 references mostly from American and English periodicals and bulletins. However, numerous foreign journals are included.

---

(26) "Critical Review of the Literature of 1943", W Rudolfs. *Sewage Works J* 16, 222-77 (1944).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

The Committee report reviews 275 references, which are classified under the following headings: general, analytical, procedures,

sedimentation, chemical and mechanical treatment, grease removal, trickling filters, activated sludge, submerged-contact aerators, chlorination, sludge digestion, sludge disposal, mechanical equipment, stream pollution, industrial wastes and bibliography.

---

(27) "Critical Review of the Literature of 1942", W Rudolfs. *Sewage Works J* 15, 197-241 (1943).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

This review covers 244 articles under the headings, biology and chemistry, laboratory methods, sedimentation, chemical treatment, trickling filters, activated sludge, chlorination, sludge digestion, sludge disposal, innovations, equipment, stream pollution and industrial wastes.

---

(28) "Critical Review of Literature of 1941", W Rudolfs. *Sewage Works J* 14, 317-67 (1942).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A critical review of the literature of 1941 on sewage and waste treatment and stream pollution.

---

(29) "Critical Review of the Literature of 1940", W Rudolfs. *Sewage Works J* 13, 187-238 (1941).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

A critical review of 250 references to the literature during 1940 is given. The journals covered are American, English, and German.

---

(30) "Stream Pollution and Questions of the Location of Industries Producing the Waste Waters", H Haupt. *Gesundh Ing*, 564-567 (1941).

(Schliessfach 31, Munich 1, Germany.)

In the choice of a location for an industrial plant producing a large amount of wastes, the capacity of the stream to "absorb" the wastes and the dilution ratio must be considered in determining the probable self-purification. Such questions are discussed for the case of dairy farms, flax-steeping plants, and plants processing cellulose.

---

(31) "Critical Review of the Literature of 1939", W Rudolfs. *Sewage Works J* 12, 189-243 (1940).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

The research in sewage chemistry, sewage and water treatment and stream pollution is summarized. The committee reviewed 267 references, largely from American journals but including numerous important foreign journals, under the headings of chemistry and biology, methods, chemical treatment, trickling filters, sludge, sludge digestion, sludge disposal, chlorination, mechanical developments, industrial wastes and their effects on sewage treatments, and stream pollution.

---

(32) "Critical Review of the Literature of 1938", W Rudolfs. *Sewage Works J* 11, 159-94 (1939).

(Federation of Sewage and Industrial Wastes Associations, 325 Illinois Bldg, Champaign, Ill.)

The research in sewage chemistry, sewage and waste treatment and stream pollution is examined. This review covers 190 references to American and European literature on the chemistry and biology of sewage treatment. The work is subdivided into the following groups: methods and laboratory procedures, sedimentation, chemical treatment, filtration and straining devices, chlorination, activated sludge, sludge digestion, mechanical development, industrial wastes, effect of industrial wastes on sewage treatment, stream pollution, and a section on trickling filters to be published later.

---

(33) "Critical Review of the Literature of 1937", G P Edwards, C A Emerson, Jr, H A Faber, H F Gray, H Heukelekian, W Rudolfs, H W Streeter and E B Phelps. *Sewage Works J* 10, 173-208 (1938).

(Federation of Sewage and Industrial Wastes Assoc, 325 Illinois Bldg, Champaign, Ill.)

A review of the literature, outlining the progress in sewage chemistries, sewage treatment, and water-pollution control during 1937.

---

(34) "Critical Review of the Literature of 1936", E B Phelps. *Sewage Works J* 9, 135-70 (1937).

(Federation of Sewage and Industrial Wastes Assoc, 325 Illinois Bldg, Champaign, Ill.)

A review and digest of 102 published articles on research in sewage chemistry, sewage treatment and stream pollution.

---

(35) "Textile Waste Treatment and Recovery", J C Geyer and W A Perry (1936).

(The Textile Foundation, Inc, Washington, D C.)

A monograph dealing with the entire field of stream pollution, wastes and recovery treatments, sewer usage, research in waste disposal, nature of waste liquors, treatment installations, treatment by municipal sewage works, and state laws dealing with stream pollution. A bibliography of 340 references is given in the appendix.

---

(36) "Work of the Connecticut State Water Commission", William S Wise. *Am Inst Chem Eng*, December (1931). (Atlantic City Meeting.)

(McGraw-Hill Publishing Co, Inc, 330 W 42nd St, New York 18, N Y.)

A satisfactory treatment of all industrial wastes in such a manner as to yield a profit to the manufacturer is hopeless. He must clearly recognize his responsibility in protecting the rights of the public in the State's waterways. Research work must form the basis of making equitable decisions in the allocation of streams to the most economic uses. It has been found practicable to prevent a large part of the injury to streams which had previously been considered unavoidable. Researches on ferrous wastes, kier liquors, textile-mill wastes, laundry waters, tannery effluents, wool-plant and felt-mill wastes are discussed.

---

(37) "Alkalies and Chlorine in the Treatment of Municipal and Industrial Water". Bulletin No. 8.

(Solvay Sales Corporation, 40 Rector Street, New York 6, N Y.)

This bulletin deals with water purification.

---

(38) "Survey of Textile Wastes, NEIWPC Compact Area", Department of Civil Engineering, Rhode Island State College, Kingston, R I.

(Mass Department of Public Health, Boston, Mass.)

Data have been compiled on the problem of stream pollution in New England. The report contains statistics on all textile mills within the NEIWPC area.

AATCC Symposium——

Dyeing Session*

PAUL J CHOQUETTE, Chairman
General Dyestuff Co
New York, N Y

MATTHEW J BABEY, Co-chairman
American Cyanamid Co
Bound Brook, N J

The four papers which follow were presented on Wednesday, May 19, 1954 before the Dyeing Session of an all-day AATCC symposium, which was held in the Hotel Statler, New York, N Y, with Paul J Choquette, General Dyestuff Co, presiding. A fifth paper presented at this session, "Spun-Dyed Viscose", by Leslie L Walmsley, American Viscose Corp, appeared on page P790 of the November 22, 1954 issue of this publication.

I DYEING THE NEWER SYNTHETIC FIBERS IN BLENDS WITH CELLULOSIC FIBERS

WALTER H HINDLE
The Chemstrand Corporation
Decatur, Ala

Although it was probably hoped by those who developed the new wholly synthetic "miracle" fibers that they would be used mostly alone, the speaker points out that they have come to be used very largely in combinations with the older fibers. He discusses mainly the dyeing of blends of Dynel, Dacron, Orlon, and Acrilan, respectively, with viscose rayon but includes also some binary and ternary combinations involving cotton or acetate.

INTRODUCTION

WHEN the various new fibers came into production in the years just after the last war, it was doubtless the hope and expectation of the manufacturer that by virtue of their characteristics their main use would be in fabrics of 100% new fiber. Several years and many thousands of trials later, it became apparent that a large poundage of these newer synthetic fibers would be blended with wool, cotton, viscose or acetate. This talk will be devoted to a discussion of some of the dyeing techniques currently in use for the new synthetics blended with cellulosics.

Not the least of the reasons why the newer fibers have been blended with cellulosics has been the question of price, for, whereas initially the latest synthetics were thought of as substitutes for wool and their price did not differ substantially from that of wool, it was obvious that, if the beneficial effects were to be felt in the less expensive fields, then they would have to be used in conjunction with the cheaper and by now well-established viscose and acetate and to a lesser extent with cotton. The decisions involved were not easy ones for those responsible for fabric manufacture, for, in addition to those who were thinking of how to incorporate the functional properties of the newer fibers at a price appealing to a wider range of buyers than what the 100%-wool or 100%-newer-synthetic textiles could reach because of cost, there were also those who were trying to effect quick capitalization of that ill-conceived phrase "miracle fiber." All of us here today have without doubt seen examples of such claims made for a fabric based on a new fiber content, most of which lay in the selvage or in a decoration or effect thread. It is not about this type of operation that I shall talk today, but rather on the many cases at present where enough of the newer synthetics have been used to provide a basic value, while at the same time entering into a broader market because of their blending with viscose and acetate. Strong differences of opinion still exist as to what constitutes an effective blend. The proportion may vary from 15 to 70% in accordance with the qualities sought for in relation to the type of fabric construction under consideration. For instance, we have seen many examples of the value of as little as 15% of nylon in increasing the abrasion resistance of acetate and viscose fabrics.

It is not the relatively low-percentage blends that we propose to discuss today for, because of that low percentage, dyeing differentials can be more readily submerged into the over-all picture, but rather, it is proposed to discuss those blends where differentials cannot be ignored but have to be brought under control. Therefore, it is proposed for the purpose of this talk to consider primarily the dyeing of new fiber blends with cellulosics where the new fiber content is not less than 25%.

PROGRESS IN ACETATE AND RAYON DYEING——Before entering into the strictly new-fiber phase of this discussion, it might be well to review some of the progress that has been made in the dyeing of the older synthetics, mainly acetate and viscose rayon, over the course of the past few years. Research by dyestuff manufacturers has produced and still is producing many simple-to-apply direct dyestuffs which are capable of dyeing cotton and rayon to meet many

normal requirements in the way of light and wash fastness. Many of these dyestuffs have been constructed chemically to couple with copper, nickel and cobalt salts to insolublize the dyestuff on the fiber with the consequent improvement in wet fastness to a point deemed impossible only a few short years ago. The use of crease-resistant finishing has in itself contributed to the improvement of wetfastness on viscose blends, and the fact that many of the materials used in aftertreating direct dyestuffs can be incorporated into the resin-finishing process has helped effect still further improvement by relatively simple means. In the cellulose-acetate dyeing field, more recent developments by the dyestuff manufacturers coupled with improvements by the dyers themselves have resulted in major steps toward the elimination of the one-time *bete noire* of the cellulose-acetate dyeing world, gas fading, while at the same time a judicious selection of acetate dyestuffs in relation to various aftertreatments and in conjunction with resins has also led to a very considerable improvement in washfastness even over the course of the past few months. There are now on the market a number of viscose and acetate fabrics with 140°F washfastness, and the time is not far distant when still further improvements can be expected.

GENERAL DISCUSSION

DYNEL WITH CELLULOSICS ——— Turning now to the cellulosic fibers blended with the more recent man-made fibers, we will study their dyeing properties first in the case of Dynel copolymer fiber as manufactured by the Union Carbide and Carbon Company. The manufacturers of Dynel do not recommend its use in blends above 35% with rayon or rayon-acetate and actually prefer 30%. Dynel in the acrylic range of fibers has a property of sensitivity to heat at normal textile-processing temperatures of 240 to 250°F and, unless restricted by tension, will shrink to produce a firming of hand. In the early stages of Dynel dyeing and finishing this property presented a severe difficulty. However, in the recommended blends with rayon and cellulose acetate some authorities now believe that this property of fiber shrinkage under conditions of heat is even an advantage and is deliberately brought about as part of a normal dyeing and finishing operation. It is felt that as a result of such a shrinkage the Dynel component of the blend shrinks away from the outside of the fiber blend toward the center and becomes part of a basic innerstructure, which imparts to the blend the desirable properties of the Dynel fiber insofar as crease retention, wrinkle resistance, drape, etc are concerned. This shrinkage is not carried out without a firming of hand, but a mechanical processing tends to break down the initial firmness to the point where the finisher can exert his influence in the desired direction. It is not uncommon in the handling of Dynel-rayon blends for the dyer and finisher to establish this shrinkage by means of a heat treatment before dyeing so that the subsequent dyeing operation will mechanically break down any tendency toward set hand while at the same time preserving the value of the Dynel at the core of the fiber. Once treated in this way, the goods have a greatly reduced tendency to firm up in any resin-finishing operation that may be carried out by normal means. Insofar as the actual dyeing operation is concerned, a wide range of union shades can be obtained in a single-bath method by using regular rayon and selected disperse (acetate) dyestuffs, although, in order to obtain a maximum color yield from the disperse dyestuffs, temperatures in excess of 200°F are necessary. In addition to the disperse dyestuffs, neutral-dyeing premetalized dyestuffs also provide a single-bath method in conjunction with rayon dyestuffs for dyeing Dynel and rayon blends to attain lightfastness in general superior to that obtained with disperse dyestuffs. However, the neutral-dyeing premetalized dyestuffs have only a limited power to build up into heavy shades without the use of a carrier system, which in turn offers complications insofar as its effects upon the direct colors on the rayon component are concerned.

A wide range of acid dyestuffs is applicable to Dynel in light shades by normal means, but here again the shade-build-up power is limited without the use of a copper-ion method, and, where the heaviest of shades are desired, the use of a carrier such as paraphenylphenol becomes necessary. There has been work done in recent months in dyeing dark shades by combining the cuprous-ion process with the use of selected direct dyestuffs capable of withstanding the effects of the reduced-copper method of dyeing. With careful control, this method has yielded many satisfactory results. The phenomenon of relustering, which occurs in Dynel when it is subjected to dry heat, appears to have been brought under control in blends comprising not over 30% Dynel to 70% cellulosic fibers. In dyed Dynel this property manifests itself by increased color depth as drying temperatures increase, but it has been found that, if the dyer can anticipate the heat to which the goods will ultimately be subjected and treats his hand samples in the same manner, a good measure of control can be obtained. A control of this nature, combined with the fact that, under conditions of temperature the Dynel shrinks away from the surface, has tended to minimize the initial difficulties to provide a practical commercial application.

In blends where there is a large predominance of rayon, it is usually necessary to finish in accordance with rayon techniques and, in the case of rayon-Dynel blends, if the Dynel shrinkage has first been induced, any further shrinkage that could be caused in a conventional crease-resisting process has been radically minimized.

DACRON-RAYON ——— Procedures for dyeing Dacron-and-rayon blends have now been fairly well established and, for the most part, involve the use of selected disperse (acetate) dyestuffs in conjunction with a carrier for the Dacron and normally used direct dyestuffs for the rayon. Much has been said and written about carrier systems of dyeing, and it has been generally agreed that, although their use is not without problems, they are necessary at least for the time being. None of the carriers used today measures up to all requirements because of cost, toxicity, handling problems and difficulty of disposal, but nevertheless, carriers have become a part of everyday life for the dyer and have become generally accepted.

Over the course of the past two years, in discussing with stylists, designers and converters the dyeing of new fibers in combination with cellulosics, I have been asked the question with monotonous regularity as to whether the process under discussion involves a one- or two-bath process with the underlying implication that a two-bath process is of necessity more expensive than a single-bath. Whether Dacron and rayon should be dyed by a one- or two-bath process is to some extent governed by the nature of the carrier used. For instance, much effective work has been done in the union dyeing of Dacron-rayon blends by a single-bath process using the chlorinated-benzene type of carrier, which steam distills and does not present the same problems as do phenolic-type carriers, for instance. This type of carrier requires efficient ventilation, as the steam distillate can be harmful to individuals working in the area. However, the phenolic type of carrier, which does not steam distill, is more difficult to remove from the fiber, and attempts to wash out this type of carrier at the conclusion of a single-bath dyeing operation in which the Dacron and rayon are dyed simultaneously can result in loss of union and cause problems in color matching because a treatment sufficiently strong to remove a carrier will also remove the rayon dyestuff before it is fixed.

A two-bath method provides for a first step in which the Dacron is dyed with the prescribed carrier, followed by a washing operation to remove the carrier and a third step in which the rayon is dyed

and the fabric brought to shade by conventional means. In the hands of a skillful dyer, a two-bath process does not necessarily involve double dyeing time, and, as a matter of fact, a two-bath method provides a more effective control on the union. There is also a definite advantage to be gained in dyeing the Dacron in the first bath in a relatively short time for it has been found that a prolonged dyeing time as elevated temperatures can result in dyestuff agglomeration (tarring). The shorter the length of time for the dispersed (acetate) dyestuff, the less is the danger of this condition arising. With these factors to be considered, it should be borne in mind that the short cut is not necessarily the cheapest or best way home.

DACRON-RAYON-ACETATE——
The introduction of cellulose acetate into Dacron-viscose patterns offers the dyer a complication in that, although disperse dyes are used for both Dacron and acetate, the rates of dyeing are very different. It has been found recently that very much can be done by a very careful dyestuff and carrier selection in the way of union dyeing. In considering the blend of Dacron and acetate and rayon, the position that each combination of fiber is to occupy in the fabric is of importance. For instance, in such a construction as a bengaline where the filling is substantially hidden by the warp, an incomplete union between Dacron and acetate is not necessarily a severe drawback as compared with a fabric construction where every fiber is readily visible. This factor has to be borne in mind in any statement as to what blending can or cannot be done in projecting new fabrics from a dyeing standpoint.

In the case of blends of Dacron and cotton, there has been some experience in using vat dyestuffs, which have given very satisfactory unions between the two fibers, although close examination shows the Dacron to be less dyed than is the cotton. However, in cases where the lack of union between cotton and Dacron is too readily apparent, then the Dacron can be filled by a number of dyeing techniques, and, in view of the very good wetfastness to be obtained from Dacron, the over-all colorfastness of the blend would only be very slightly impaired. There are many who believe that, within a very few years, vat dyestuffs will play a major part in the dyeing of polyester Dacron.

A method of dyeing Dacron without recourse to carriers involves a high-temperature dyeing method, such as is accomplished on the recently developed Barotor machine, of which there are now several in operation in this country. Eventually it is expected that direct dyestuffs will be developed that will be able to withstand the high temperature required for the Dacron dyeing operation, but up to the present the best results have been obtained by first dyeing the Dacron component under pressure and then dyeing the rayon in a second bath at normal temperatures.

In the dyeing of Dacron, although most disperse (acetate) dyestuffs will yield effective coloring, dyestuff selection plays a very important part in the over-all picture, and, here again, dyestuff research has provided the dyer with tools without which it would have been impossible to dye Dacron, which is now established as possessing good all-around fastness suitable for a wide variety of end uses.

In the dyeing of Terylene polyester in England, emphasis was initially placed on the use of naphthol-base combinations which, although very satisfactory in self shades, were quite inadequate for producing a range of menswear shades with regular reproducibility.

The value of dyestuff research on Dacron polyester has been amply demonstrated by the present status of Dacron colorfastness. This statement does not infer that there are now no more problems in Dacron dyeing, not the least of which is the high cost particularly of dark shades, but, nevertheless, considering the relative youth of Dacron in relation to the older synthetic fibers, outstanding progress has been made.

ORLON-CELLULOSIC BLENDS——
The piece dyeing of Orlon-cellulosic blends is effected by three general techniques:

1) A single-bath method involving the use of dispersed (acetate) dyestuffs and regular rayon dyestuffs at temperatures of 205°F for shades up to the light-medium range.

2) A two-bath method employing selected basic dyestuffs for the Orlon in the first bath, followed by a clearing of the rayon and a second dyebath in which the rayon is brought up to shade by conventional means. This technique covers the medium to medium-dark range.

3) A two-bath cuprous-ion process, in which the Orlon is first dyed by the cuprous-ion method followed by a step to clear the rayon from the influence of copper, followed by a conventional dyeing of the rayon with direct dyestuffs. This technique covers the very heavy shades not obtainable by the use of basic dyestuffs.

The dyeing of Orlon-rayon blends with disperse (acetate) dyestuffs up to light-medium shades presents no undue problems and, except for the fact that higher temperatures are required than in the dyeing of acetate and rayon. The light and wetfastness to be obtained from this operation are very good indeed. However, there appears to be a definite limit in shade depth to which Orlon 42 can be dyed with acetate dyestuffs with maintenance of good wetfastness. In general, the use of acetate dyestuffs beyond the medium-shade range meets the law of diminishing returns. A full and complete shade range from medium to dark can be obtained on Orlon-rayon blends by using selected basic dyes for the Orlon component in a two-bath process. The basic dyestuffs on Type 42 Orlon are distinguished by their outstandingly good wetfastness, which is very considerably superior to that of rayon dyed with after-treated direct dyestuffs. One of the key points in the dyeing of Type 42 Orlon with basic dyestuffs is the need for obtaining and maintaining temperatures of 207 to 210°F. Between these temperatures a very efficient use of the basic dyestuffs can be obtained, but below 205°F the difference in temperature can be compensated for by an increase in dyeing time and by the use of certain carriers, such as phenol. The lightfastness of the basic-dyed Orlon component in shades above the medium classification is satisfactory for most end uses. With the exception of the green and fuchsin components, the tinctorial power of the selected basic dyestuffs is somewhat low, and attempts to force basic colors into shades too heavy for their capabilities can result in high cost.

The cuprous-ion method of dyeing is used for the shades not obtainable with basic dyestuffs. This normally involves a two-bath process with rayon and has often been described at great length and in full detail. There can be no question that, given accuracy of control and effective supervision, this system of dyeing can be a very effective tool. If satisfactory dyeing of rayon is to be accomplished, it is imperative that the rayon be cleared of copper before the start of the rayon-dyeing operation. Recently a number of direct dyestuffs that tolerate the cuprous-ion method have been developed. A dyeing carried out at normal pressure by the cuprous-ion method does not display as good wetfastness as does a dyeing with basic dyestuffs, and particularly is this noticeable in the case of the alkaline perspiration tests.

The finishing of Orlon-rayon blends follows conventional lines where the percentage of the Orlon is low, the need for rayon finishing is considerable. In fabrics where there is a substantial amount of Orlon, say for example 75%, the value of a typical rayon-finishing treatment is extremely doubtful. In my opinion, there yet remains to be developed a finish designed specifically for the acrylics. Cellulose acetate does not lend itself to blending with Orlon and rayon from a dyeing standpoint if the Orlon is to be dyed for

the reason that basic colors stain acetate very much, disperse (acetate) dyestuffs have more affinity for acetate than for the Orlon, and the cuprous-ion technique causes considerable stain on acetate. Such a combination is therefore difficult insofar as union dyeing is concerned.

ACRILAN COMBINATIONS——The improved Acrilan currently on the market is an acrylic fiber manufactured by The Chemstrand Corporation. It is readily dyeable by conventional methods with disperse (acetate), acid, chrome, neutral-dyeing premetalized, acid-dyeing premetalized, and vat dyestuffs. Under no circumstances are carriers necessary. The disperse (acetate) class of dyestuffs will probably be the work horses of the trade for blends with rayon where a complete range of shades from pastel to black can be obtained at 205°F in relatively short dyeing periods. The wetfastness of Acrilan dyed with disperse dyestuffs is remarkably good, there being no staining on the AATCC test cloth under the conditions of the 140°F wash test nor any loss of color. In conjunction with rayon, it has been found that after-coppering Acrilan in Acrilan-rayon blends produces a washfastness on the Acrilan component capable of withstanding a #3 AATCC Cotton Wash Test. In effect, the dyeing of Acrilan-rayon blends with disperse (acetate) dyestuff is closely similar to the dyeing of acetate and rayon except that a temperature of 205°F is required for dark shades. Neutral-dyeing acid and neutral-dyeing premetalized dyestuffs in conjunction with rayon dyestuffs will also give effective union by a single-bath method and are recommended for end uses where very superior light fastness is required. Dyeings of this nature are carried out in a one-bath, two-step method in which the Acrilan component is first dyed from a weakly acid bath followed by a neutralizing step and a completion of the rayon dyeing. Single-bath cross dyes can also be obtained by using selected acetate and direct dyestuffs as is the case in acetate and rayon dyeing, and a full range of shades can be produced by dyeing the rayon and leaving the Acrilan undyed by use of the resisting materials normally employed for nylon.

Cellulose acetate can be used in combination with Acrilan and rayon in a one-bath method to give union dyeings, two-color dyeings and even three-color effects. These last can be obtained by first dyeing the Acrilan into the required shade with neutral-dyeing premetalized types from a weakly acid bath and then dyeing the acetate and rayon components at a reduced temperature by normal means in the same dyebath. Under the condition of lowered temperature and in the presence of acetate the Acrilan component remains unstained to yield 3-color effects. The applicability of conventional well-established dyeing techniques without carriers for dyeing Acrilan means that the dyeing of this fiber is a very simple and straightforward process.

It is interesting to note that a 100%-acrylic blend capable of being piece-dyed to produce tone-in-tone cross-dyes and two-color effects can be used by blending Acrilan and Type 42 Orlon. On the one hand, it is possible to dye the Acrilan component into a full range of colors with acid dyestuffs that leave Orlon relatively undyed. On the other hand, by initially applying basic dyestuffs to obtain the required shade on the Orlon-42 component followed by a subsequent dyeing of the Acrilan component with acid dyestuffs in the same bath, sharp and well-defined two-color effects can be obtained.

Although the dyeing of the newer synthetics has been discussed only in the most general fashion in this paper, it will be readily apparent that the dyer's role over the course of the past few years has been one of increasing complexity. Now that the newer fibers are meeting with general acceptance and have been truly launched, one of the major objectives of research should be a return to simplicity.

DISCUSSION

Question: Have you encountered crocking from dyeings of disperse dyes made at high temperatures, especially dyeings made in a Barotor machine?

Answer: I presume you mean poor crocking fastness that results from the tarring of disperse dyes at high temperatures. I shall let a Barotor expert answer that.

A: The disperse (acetate) dyes that are to be used at 250°F should be screened before use to eliminate those few that are subject to tarring.

II DYEING NEWER BLENDS OF WOOL WITH SYNTHETICS

H LUTTRINGHAUS*
Progressive Color & Chemical Co
New York, N Y

INTRODUCTION

ANYBODY who dares to talk about wool in mixtures with newer synthetic fibers takes the chance of contradicting himself. Today I cannot avoid saying things which make former published and unpublished statements of mine appear wrong. The modern blends present so many problems that our knowledge is necessarily increasing all the time with the advancement of our research. Methods of application are in such a flux that in a few months from now many facts mentioned in this paper might be obsolete.

A discussion of the latest methods for dyeing unions on binary blends of wool with silk, nylon, Vicara zein fiber, Dacron polyester fiber, Orlon acrylic fiber, Acrilan acrylic fiber (which contains some copolymer), and Dynel copolymer fiber, respectively. Methods are also suggested for solid shades on Vicara-nylon blends. A special feature is that many of the colors are made recognizable with Munsell notations for those with Munsell Color Books.

The present phase is very interesting. As a matter of fact, it is as difficult as it is interesting, and I am not going to tell you how easy it is to produce solid shades on this and that blend. I am not doing this to favor the dyer with undue protection, but because I am going to tell you the truth, as well as it is known to me. If you feel that my statements show too much optimism here and there, do not forget that it is just my nature.

DISCUSSION

SILK-WOOL——To start off with something relatively easy, I am going to talk first about silk and wool blends. The use of wool-silk mixtures appears to be increasing, and some difficulties have been encountered in the production of solid shades. It has been found that our experience of years ago and older recommendations do not lead to satisfactory results. An investigation on a 60-40 mixture of wool and silk showed that the heaviest dyeings were obtained on the silk from a neutral bath in the presence of 30%

* At the time of presentation of this paper, Dr Luttringhaus was with General Dyestuff Corp.

of common salt (owf). In this manner it is even possible to dye silk heavier than wool if the following dyestuffs are used:

Milling Yellow H5GA
Sulphon Yellow RS Ext CF
Fast Silk Yellow GSN
Supranol Orange RA Conc
Supranol Red PG Extra CF
Supranol Red PRX-CF
Supranol Red BB
Supranol Bordeaux BRRN
Violamine RD-CF
Formyl Violet S4BA
Acid Violet 4BLD
Wool Fast Blue BLA Extra
Brilliant Milling Blue BA New CF
Brilliant Indocyanine 6BA-CF
Brilliant Wool Blue FFRS Extra CF
Wool Fast Blue GLA Extra
Wool Fast Blue FFG
Brilliant Indocyanine GA-CF
Brilliant Indo Blue 5G High Conc CF
Indocyanine B Conc
Guinea Green BA Ext Conc
Palatine Fast Black WANA Conc
Supranol PBX-CF

If sodium sulfate is used in place of common salt, the silk is dyed distinctly weaker. With decreasing amounts of salt the depth on the silk decreases, while the wool absorbs more dyestuff. The 23 dyestuffs selected here have such strong affinity for silk that they are not readily transferred to wool even when acetic acid is added to the bath. However, it is possible to fill up the wool by the addition of more dyestuff in the presence of 1 to 3% acetic acid 28% or 3 to 5% of ammonium sulfate. The wool can of course also be filled up readily with any other dyestuff that has more affinity for wool than silk.

Palatine Fast Black WANA is applied on wool-silk mixtures from a bath containing 4% of sulfuric acid (owf).

NYLON-WOOL——I am not going to repeat in detail the dyeing of nylon-wool mixtures. Contrary to claims being made at times we are still of the opinion that no single group of dyes can be recommended for all depths of shade. In weaker shades the nylon usually absorbs most of the dye before the temperature is high enough for the wool to be dyed. In heavy shades the opposite occurs. In the first instance we recommend retarding agents such as Palatine Fast Salt N Conc Powder, Prestabit Oil V, or Nylon Resist GDC. The production of heavy shades used to be difficult because not enough dyestuffs of low sulfonation were available. The new premetalized neutral-dyeing types, such as the Supralans, solve this problem perfectly.

In contradiction to other acid dyestuffs the free sulfonic acid groups of the Supralans are blocked, and they therefore show no selective absorption on nylon *(1)*. Since these dyestuffs possess very good fastness on both nylon and wool, they can be used for dark shades alone or in combination with other dyestuffs of similar dyeing properties. They can also be used for filling up the nylon when it happens to be lighter than the wool.

VICARA-WOOL——When I discuss blends with Vicara, I must specify that I am not talking about the new Vicara code 500, High-Crimp, which has appeared on the market only recently. This new brand has much less affinity for most dyestuffs, especially those of good fastness to washing. Our experience with the new Vicara is too limited at the present time for discussion. For the regular Vicara we can refer you to an earlier publication *(2)* where formulations are given for 24 shades on a 50-50 Vicara-wool blend.

VICARA-NYLON———Of more interest at the present are mixtures of Vicara and nylon. This popular blend is especially suitable for sweaters. The soft hand might even be taken for cashmere. My remarks here again do not cover high-crimp Vicara. Whenever this new brand is mixed by mistake with the normal brand and nylon, I would suggest not to fire your dyer on account of spoiled lots because nobody will be able to help him.

It will not be possible to give you a list of dyestuffs that will produce solid shades under all conditions. Sometimes it is necessary to blend two acid blues in order to obtain a solid shade. Therefore, we think it best to publish established formulations for the most popular shades being required at the present time by the sweater trade.

To overcome the ambiguous description of certain shades, we shall identify these by approximate Munsell notations. These numbers will be given under the verbal description of all shades mentioned throughout this paper. Thus, we hope to overcome any vagueness of expression because it will be possible for everybody to look up the shades for our formulations in a Munsell book.

Vicara-nylon sweater bodies made from a 50-50 blend containing bleached Vicara (not the high-crimp 500 type) and staple nylon were employed in making the dyeings. Most of the dyeings were carried out in the presence of 10% of anhydrous sodium sulfate and 3% of 85% formic acid, both owf, but the Palatine Fast dyestuffs give more level results in the presence of 5% of 85% formic acid and 10% of anhydrous sodium sulfate.

% owf	
	Baby Pink, 1.0 R 9/4
0.006	Sulpho Rhodamine B Extra
	Baby Pink, 10.0 RP 9/6
0.006	Sulpho Rhodamine B Extra
0.2	Blancophor AW High Conc
	Baby Pink, 2.5 R 8/4
0.024	Alizarine Rubinol 3G-CF
0.5	Palatine Fast Salt N
	Baby Pink, 7.5 RP 8/4
0.024	Alizarine Rubinol 3G-CF
0.2	Blancophor AW High Conc
0.5	Palatine Fast Salt N
	Baby Blue, 2.5 PB 7/4
0.06	Alizarine Direct Blue ARA
0.01	Acid Violet 4 BLD
	Baby Blue, 5.0 PB 6/6
0.06	Alizarine Direct Blue ARA
0.01	Acid Violet 4 BLD
0.2	Blancophor AW High Conc
	Maize, 7.5 Y 8/6
0.1	Supramine Yellow 3GLA
	Maize, 7.5 Y 9/6
0.1	Supramine Yellow 3GLA
0.2	Blancophor AW High Conc
	Mint
0.013	Alizarine Blue SAP
0.020	Alizarine Direct Blue ARA
0.020	Alkali Fast Green 10GA
0.012	Chinoline Yellow D Conc
	Light Green, 10.0 G 7/4
0.016	Alizarine Blue SAP
0.026	Alizarine Direct Blue AGG
0.016	Alkali Fast Green 10GA
0.032	Supramine Yellow 3GLA
0.004	Patent Blue AF Extra
	Greenish Blue, 2.5 B 7/3
0.045	Palatine Fast Yellow ELNA
0.160	Palatine Fast Blue GGNA
0.035	Palatine Fast Yellow GRNA
	Dark Green, 10.0 BG 3/5
1.3	Alizarine Blue SAP
0.16	Alizarine Direct Blue ARA
0.48	Supramine Yellow 3GLA
0.58	Fast Light Yellow GGXN-CF
0.20	Naphtaline Green V Extra Conc
0.16	Azo Fuchsine 6B New
	Peach, 2.5 R 6/8
0.28	Palatine Fast Red GREW
0.30	Palatine Fast Orange GENA
1	Palatine Fast Salt N
	Rose, 7.5 RP 6/8
0.30	Palatine Fast Pink BS
0.12	Palatine Fast Orange GENA
0.01	Palatine Fast Blue GGNA
	Claret, 2.5 R 3/9
2.0	Fast Red ALS
1.0	Supramine Bordeaux BA
0.2	Alizarine Direct Blue ARA
	Jockey, 7.5 R 4/16
2.0	Fast Acid Red E Conc CF
	Violet, 2.5 P 3/8
1.10	Azo Fuchsine 6B New
0.22	Alizarine Geranol B
0.21	Alizarine Blue SAP
0.18	Alizarine Direct Blue ARA
	Navy, 7.5 P 2/5
2.70	Alizarine Blue SAP
0.25	Fast Light Yellow GGXN-CF
0.50	Azo Phloxine GA Extra Conc
0.21	Supra Light Rubine BLA
	Bright Navy, 7.5 PB 2/8
2.40	Alizarine Blue SAP
0.34	Azo Phloxine GA Extra Conc
0.14	Supra Light Rubine BLA-CF
	Ecru, 2.5 Y 8/2
0.032	Amido Naphtol Brown 3GA
0.006	Supramine Yellow 3GLA
0.002	Alizarine Blue SAE

% owf

Luggage Brown, 2.5 YR 5/7.5

1.8 Amido Naphtol Brown 3GA

Cocoa, 5.0 YR 2/2

4.4 Palatine Fast Seal Brown JFM Conc 125%
0.6 Palatine Fast Orange GENA

Navy, 7.5 PB 1/6

3.00 Alizarine Blue SAP
0.15 Fast Light Yellow 3GXN Conc
0.60 Azo Phloxine GA Extra Conc
0.25 Supra Light Rubine BLA
0.20 Victoria Fast Violet RRN Conc

Taupe, 10.0 P 4/1

0.10 Palatine Fast Orange RNA
0.06 Palatine Fast Orange GENA
0.04 Palatine Fast Yellow GRNA
0.26 Palatine Fast Blue RRNA

Blue Grey, 2.5 PB 5/2.5

0.28 Palatine Fast Blue GGNA
0.08 Palatine Fast Orange RNA
0.10 Palatine Fast Orange GENA

Greenish Grey, 2.5 B 5/2

0.04 Azo Phloxine GA Extra Conc
0.08 Supramine Yellow 3GLA
0.08 Fast Light Yellow GGXN-CF
0.06 Azo Fuchsine 6B Extra Conc New
0.20 Alizarine Blue SAE

Orchid, 5.0 P 6/6

0.18 Alizarine Geranol B
0.01 Alizarine Direct Blue ARA
1.0 Palatine Fast Salt N

Black

6.0 Supramine Black BRA
1.0 Supranol Orange RA
0.3 Alizarine Cyanine Green GHN Conc

DACRON-WOOL———When we talk about dyeing blends of wool with other fibers, it is generally understood that we mean piece goods or yarns. However, a few successful runs were made on blended wool (85%)—Dacron (15%) tops, which should be mentioned here in principle. The tops were wet out at 120°F; 20% Monochlorobenzene (owf) emulsified with 0.5% Monopol Oil 48 was added; and, after 10 minutes, selected disperse (acetate) dyestuffs were added. The temperature of the bath was raised to 180-190°F and was kept there for 30 minutes.

The dyeing of Dacron with monochlorobenzene should not be carried out above 190°F to avoid evaporation of the carrier. Then the temperature is raised to 205-210°F and is kept at 210°F for 15-20 minutes. During that time monochlorobenzene is removed by the principle of steam distillation. The bath is dropped, and the tops are rinsed before the wool is topped with monochrome dyestuffs. The wool is stained very little in the presence of monochlorobenzene, but the wool can be cleared completely by topping with Helindons.

We are aware of the fact that chlorinated benzenes can be poisonous to a certain extent, but it must also be considered that in one well-ventilated dyehouse, many thousands of pounds of Dacron were dyed without any complaint. Monochlorobenzene can only be used when the material stays under the liquor during the entire dyeing cycle. It has a high affinity for Dacron, and dispersed dyes concentrate in this solvent. The fiber is therefore surrounded with a concentrated solution from which the rate of diffusion is enhanced. The best yield and the best penetration are therefore obtained with chlorinated benzenes, the wool being left practically unstained. We would like to mention here that certain vat dyestuffs produce fluorescent shades on Dacron if they are dyed in the presence of monochlorobenzene. The brightest red available on Dacron can thus be obtained with Helindon Red BB. The fastness to sublimation of this red is perfect and cannot be approached with disperse dyes.

Only a carrier of very limited volatility will be of value for the dyeing of piece goods. We are not going to confuse you with a multitude of dyeing methods but shall suggest the one that we consider the best. This method, which, had its origin at Textile Aniline & Chemical Company, utilizes diammonium phosphate and Dowicide A. Diammonium phosphate plays a two-fold role. In contradistinction to acetic acid it forms a finely dispersed precipitation of the orthophenylphenol, and, being alkaline, minimizes the staining of the wool with Celliton colors.

The dyebath is prepared with 5 g per liter or 4 lb per 100 gallons of diammonium phosphate, and the Dacron-wool blend is run therein for about 10 minutes. While the bath is gradually brought up to 130°F, 5 g liter or 4 lb per 100 gallons of Dowicide A is added in several portions. The dyestuff is added at 130°F, and the temperature is raised to the boil. Some mills prefer a temperature of 200°F followed by boiling.

To ensure a fine dispersion of o-phenylphenol, several dyeing assistants have been recommended. We have found recently that Tetrapol is far superior for this purpose to any other product. The optimum quantity is 2 g per liter or 1½ to 2 lb per 100 gallons. We are listing here a few formulations for solid shades on 50-50 Dacron-wool blends. On a blend containing only 25% Dacron, shades are obtained that are not materially different. We are confining our shades to those of men's wear fastness, as they are more difficult than colors of lesser fastness. All shades are therefore sufficiently fast to light and perspiration.

The dyeings were carried out by a one-bath method in the presence of 4 lb of diammonium phosphate, 4 lb of Dowicide A and 2 lb of Tetrapol per 100 gallons. The temperature was finally brought to the boil and held there for about 1¼ hours. Darker shades were scoured lightly with Igepon T subsequent to dyeing.

% owf

Beige on Dacron-Wool Serge 7.5 YR 6/2

0.022 Celliton Fast Blue LAFR
0.080 Celliton Fast Yellow GGLL-CF
0.033 Celliton Fast Pink RF New CF
0.050 Alizarine Fast Grey BLN New
0.075 Supralan Brown NR
0.022 Supralan Yellow NR

Medium Brown on Dacron-Wool 7.5 YR 4/2

0.12 Celliton Fast Blue LAFR
0.42 Celliton Fast Yellow GGLL-CF
0.20 Celliton Fast Pink RF New CF
0.20 Alizarine Fast Grey BLN New
0.34 Supralan Brown NR
0.09 Supralan Yellow NR

Dark Brown on Dacron-Wool Crepe 7.5 YR 3/3

0.38 Celliton Fast Blue LAFR
1.30 Celliton Fast Yellow GGLL-CF
0.14 Celliton Fast Pink RF New CF
0.32 Alizarine Fast Grey BLN New
1.10 Supralan Brown NR
0.16 Supralan Yellow NR

Grey Blue onDacron-Wool Blend 5.0 PB 6/3

0.080 Celliton Fast Blue LAFR
0.016 Celliton Fast Yellow GGLL-CF
0.032 Celliton Fast Pink RF New CF
0.054 Alizarine Fast Grey BLN New
0.135 Alizarine Sky Blue FFG
0.018 Anthraquinone Violet D

Navy on Dacron-Wool Serge 5.0 PB 2/4

0.80 Celliton Fast Navy Blue DA
1.3 Celliton Fast Blue LAFR
0.05 Celliton Fast Pink RF New CF
0.80 Indocyanine B Conc
0.30 Wool Fast Blue BLA
0.30 Alizarine Fast Grey BLN New

Light Grey on Dacron-Wool Crepe 5.0 P 5/1

0.075 Celliton Fast Blue LAFR
0.075 Celliton Fast Yellow GGLL-CF
0.042 Celliton Fast Pink RF New CF
0.060 Alizarine Fast Grey BLN New
0.044 Supralan Brown NR
0.008 Anthraquinone Violet D

Medium Brown on 25-75 Dacron-Wool Crepe

0.26 Celliton Fast Blue LAFR
0.94 Celliton Fast Yellow GGLL-CF
0.42 Celliton Fast Pink RF New CF
0.25 Alizarine Fast Grey BLN New
0.75 Supralan Brown NR
0.13 Supralan Yellow NR

Navy on 50-50 Dacron-Wool Blend

1.0 Celliton Fast Navy Blue DA
1.3 Celliton Fast Blue LAFR
0.7 Indocyanine B Conc
0.3 Wool Fast Blue BLA

Charcoal on Dacron-Wool Blend

0.73 Celliton Blue LAFR
0.14 Celliton Fast Yellow GGLL-CF
0.44 Celliton Fast Pink RF New CF
0.49 Alizarine Fast Grey BLN New
0.29 Supralan Brown NR
0.07 Anthraquinone Violet D

We found that the fastness properties vary to some extent on different combinations for the same formulation. Navy 5.0

PB 2/4 showed, for instance, perfect fastness to acid perspiration on a 50-50 construction, while on a blend of 25% Dacron and 75% wool a dyeing of the same formula bled in the same test. In this connection we have made the observation that a short passage through a dry-cleaning fluid corrects this bleeding completely. The Derby dry-cleaning unit should therefore be of great help for the correction and also generally for the production of Dacron-wool blends.

It is known to many of you that it is particularly difficult to obtain good fastness properties for dark navy blues and dark browns. You have probably also heard that it takes about 12 hours to complete such a dyeing on Dacron-wool. Such dyeings cannot be made by a one-bath method as too much of the dispersed Cellitons is absorbed by the wool and inferior wet-fastness properties result. In most instances the Cellitons are applied first on the Dacron, and then the wool is covered with chrome dyestuffs. It seems that a lot of time is consumed by an intermediate or subsequent scouring to remove superfluous disperse color from the wool. As this is not always successful, we suggest the following procedure whereby the Dacron dyeing is treated with Blankit at 120-130°F or with Rongalite in the presence of acid above 160°F, followed by a rinse and a chrome dyeing to cover the wool.

We are trying to simplify this method and to obtain outstanding fastness properties at the same time by the use of Algosols. You know that these leucoesters of vat dyestuffs are dyed on wool in the presence of Rongalite. While the Algosol exhausts on the wool, the disperse color is at the same time removed from the wool.

We shall give you detailed formulations for two navies, a brown and a charcoal carried out in this manner. We are convinced that the fastness properties of these dyeings cannot be surpassed.

Navy 1.0 PB 1/2

1.6%	Celliton Fast Navy Blue DA
0.65%	Celliton Blue LAFR
0.35%	Celliton Fast Pink RF New CF
5g/liter	DAP
5g/liter	Dowicide A
2g/liter	Tetrapol, 1 hour at 200°F 1 hour at 212°F Rinse

5%	Algosol Blue O
1%	Rongalite CX Lumps
3%	Formic acid, 1 hour at the boil Rinse Develop cold for ¼ hour
7g/liter	sulfuric acid
1%	sodium nitrite (owf) Rinse and neutralize

Navy

1.75%	Celliton Fast Blue FFG
0.50%	Celliton Fast Brown 3 RA Extra
0.80%	Celliton Brilliant Violet BA
5g/liter	DAP
5g/liter	Dowicide A
2g/liter	Tetrapol, 1 hour at 200°F 1 hour boil rinse

2.75%	Algosol Blue O
0.12%	Algosol Yellow HCG
1%	Rongalite CX
3%	formic acid Boil 1 hour Rinse and develop at 100°F for 1 hour with
7g/liter	sulfuric acid
1%	sodium nitrite Rinse and neutralize

Brown

0.95%	Celliton Fast Blue LAFR
0.95%	Celliton Fast Pink RF New
0.95%	Celliton Fast Yellow 4RLA Conc New Method same as for color above
	---
0.72%	Algosol Blue O4B
0.56%	Algosol Pink IR
1.00%	Algosol Golden Yellow IRK
1%	Rongalite
5%	Ammonium sulfate Start cold, boil ½ hour, add
1%	Rongalite
1½%	Acetic acid 56% Boil ½ hour Develop at 185°F for 30 minutes with
10g/liter	sulfuric acid
1¼%	bichromate
1%	Ammonium sulfocyanide Rinse and neutralize with 2% soda ash

Charcoal

1.00%	Celliton Fast Blue LAFR
0.5%	Celliton Fast Pink RF New
0.25%	Celliton Fast Yellow 4RLA Conc New Method same as for color above
	---
1.25%	Algosol Grey IHL
0.01%	Algosol Brilliant Violet I4R Method same as for color above

ORLON-WOOL BLENDS——Blends of Orlon and wool in the form of yarn or piece goods may be dyed according to a special, one-bath procedure, in which acid, milling acid, chromate, or Monochrome dyes are used for the wool and Genacryl dyes for the Orlon. The use of 4% of 28% acetic acid owf (on weight of fiber blend) or of ammonium sulfate in the bath keeps Genacryl dyes off the wool, and the presence of 2% of Peregal TW owf prevents mutual precipitation of acid and Genacryl dyestuffs, the latter of which are basic in nature. Peregal TW has been found more effective for this purpose than Emulphor ON, and it has the additional advantage of promoting better penetration into tight fabrics.

The bath is set first with Peregal TW and acetic acid at 120-140°F and then with the different dyestuff classes separately dissolved. Dyeing is started, the temperature is raised to the boil, and dyeing is continued at the highest temperature for at least one hour. For heavy shades, up to 2 hours of boiling is desirable to improve penetration.

The above one-bath procedure is illustrated by sixteen formulas for a variety of useful shades on 50-50 Orlon-wool blends, many of which meet the requirements of men's-wear fastness. It is to be noted that satisfactory light fastness has been obtained for certain compound shades containing the Genacryl Blues in spite of their generally inferior resistance to light in comparison with other Genacryl dyes. Munsell notations are given alongside the color names to permit exact recognition of the shades by those who have a *Munsell Book of Color.*

% owf	
	Medium Grey, 2.5 PB 5/2
0.32	Genacryl Yellow 3G
0.18	Genacryl Pink G
0.11	Genacryl Blue 3B
0.09	Diamond Red ECB Ex Conc
0.26	Alizarine Fast Grey BLN New
3	ammonium sulfate
2	Peregal TW
0.5	bichromate
	Mauve, 2.5 RP 4/5
0.08	Genacryl Red 6B
0.06	Genacryl Orange G
0.025	Genacryl Blue 6G
0.05	Monochrome Red FGA Conc
0.06	Chromoxane Brilliant Red BL
0.04	Alizarine Supra Blue A
4	Monochrome Mordant
2	Peregal TW
	Olive Brown, 5.0 YR 3/1
0.07	Genacryl Red 6B
0.23	Genacryl Orange G
0.05	Genacryl Blue 3B
0.05	Genacryl Yellow 3G
0.12	Chrome Fast Orange 3RLA
0.06	Monochrome Red FGA Conc
0.16	Anthraquinone Blue SRN Ex
4	Monochrome Mordant
2	Peregal TW
	Yellowish Green
0.16	Genacryl Blue 6G
1.20	Genacryl Yellow 3G
0.12	Genacryl Pink G
0.20	Alizarine Yellow GG
0.24	Anthraquinone Blue SRN Ex
4	Monochrome Mordant
2	Peregal TW
	Brick Red, 5.0 R 3/10
0.30	Genacryl Orange G
0.03	Genacryl Blue 6G
1.20	Genacryl Pink G
0.80	Monochrome Red FGA Conc
0.50	bichromate
3	ammonium sulfate
2	Peregal TW
	Full Yellow, 10.0 YR 6/12
1.0	Genacryl Orange G
0.005	Genacryl Blue 6G
0.02	Genacryl Pink G
0.80	Alizarine Yellow GG
3	ammonium sulfate
0.5	bichromate
2	Peregal TW

% owf	
	Pink, 10 YR 4/2
0.035	Genacryl Red 6B
0.14	Genacryl Orange G
0.03	Genacryl Blue 6G
0.10	Chrome Fast Orange 3RLA
0.04	Anthraquinone Blue SRN Ex
0.14	Diamond Red ECB Ex Conc
3	ammonium sulfate
0.5	bichromate
2	Peregal TW
	Jockey Red, 5.0 R 4/16
0.10	Genacryl Red 6B
1.2	Genacryl Pink G
0.35	Genacryl Yellow 3G
0.50	Supranol Red PBX
4	acetic acid, 28%
2	Peregal TW
	Royal Blue, 2.5 PB 3/10
0.15	Genacryl Pink G
0.80	Genacryl Blue 6G
0.40	Alizarine Sky Blue BS
4	acetic acid, 28%
2	Peregal TW
	Lemon Yellow, 5.0 Y 9/10
0.01	Genacryl Orange G
0.07	Genacryl Yellow 3G
0.12	Supramine Yellow 3GLA
4	acetic acid, 28%
2	Peregal TW
	Pink, 10.0 RP 8/6
0.0025	Genacryl Red 6B
0.005	Genacryl Pink G
0.05	Alizarine Rubinol R
4	acetic acid, 28%
2	Peregal TW
	Navy, 5.0 PB 1/2, *on* 50-50 *Orlon-Wool*
	First Bath
0.08	Genacryl Orange G
4.0	Genacryl Blue 5B
2.0	Genacryl Pink G
4	acetic acid, 28%
	Boil one hour and rinse well.
	Second Bath
1	Rongalite CX
3	formic acid, 85%
	20 minutes at 200°F.
	Rinse.
	Third Bath
2	Monochrome Brilliant Blue FBL
1	bichromate
6	ammonium sulfate
2	Peregal TW
	Start at 120 to 140°F,
	raise the temp to the boil,
	boil at least 1½ hours,
	and rinse.
	Navy on 25-75 Orlon-Wool
	First Bath
0.4	Genacryl Orange G
1.0	Genacryl Blue 6G
2.0	Genacryl Blue 5B
1.2	Genacryl Pink G
4	acetic acid, 28%
2	Peregal TW
	Boil 1 hour and rinse well.

% owf	
	Second Bath
5	Algosol Blue O
1	Rongalite CX
3	formic acid, 85%
	Boil 1 hour, rinse, develop cold for 45
	minutes with 7 g sulfuric acid 66°Bé,
	per liter of bath and
1.2	sodium nitrite. Rinse,
	neutralize with
2	soda ash, and rinse.

Since the Genacryl Blues 5B and 6G are not only somewhat less fast to light on Orlon but stain wool more than the other Genacryl dyes and the stain on wool is not very fast, deep blues and navies on Orlon-wool blends are best dyed by a cross-dyeing procedure whereby the Orlon is dyed in a separate first step, the wool is then cleared of stain, and the wool is finally cross-dyed. Two methods are presented illustrating this method of dyeing, which could be extended to related shades. In the first procedure the clearing of the wool is carried out in a separate middle step, whereas, in the second procedure, the wool is cleared and dyed with an Algosol dyestuff in one combined second steps. Both these formulas give very good fastness properties suitable for men's wear.

It is also possible to use the Algosol-Rongalite method for Orlon-wool as it was described under Dacron-wool.

HIGH TEMPERATURE DYEING OF ORLON-WOOL AND DACRON-WOOL ———I have been told that it is possible to obtain good solid shades by dyeing blends of Orlon-wool and Dacron-wool under pressure. I do not doubt that, but I am going to let you be the judge of the feasibility of such procedures after having given you a few facts.

The temperature for dyeing Orlon or Dacron under pressure is about 250°F; the time is at least one hour. It has been established that wool is greatly deteriorated under these conditions. With fine wools, the damage was so excessive that a tensile strength test could no longer be carried out.

When therefore somebody shows me a swatch of wool and Orlon or wool and Dacron, dyed under pressure to a solid shade, I cannot suppress my suspicion that the wool in this material is just held together by the other fiber.

ACRILAN-WOOL————Inasmuch as I have not had any experience with blends of Acrilan-wool and Dynel-wool, I have to depend on other peoples' information. I have seen 50-50 Acrilan-wool mixtures that were dyed to solid shades with Palatine Fast Dyestuffs in the presence of 6% of a cationic assistant, the nature of which is not revealed, and a redispersing agent such as Emulphor ON. The cationic assistant is said to increase the affinity for Acrilan to such an extent that solid shades are obtained which have good fastness to light and washing.

Another method is dyeing with Cellitons for 2 hours at 205°F. With time the disperse color migrates gradually onto the Acrilan, leaving the wool slightly stained. After the wool is brought up to shade with acid dyestuffs, material fast enough for women's wear is obtained.

DYNEL-WOOL ——— I have received one specific procedure for a Dynel-wool blend containing 75% Dynel. The material is first scoured at 160°F with Calgon and a surfactant. Dyeing is carried out with 60% sodium sulfate and 1% Peregal TW. A mixture of disperse dyestuffs and neutral-dyeing metallized types is used. Dyeing is started at 100°F at a pH of 7.5. The disperse dyes are entered with Peregal TW, and then the metallized dyes are added. The bath is brought up to 210°F, and the dyeing is run for ½ hour. Sodium sulfate is now added, and dyeing is continued at the boil for 1 hour. The dyed material is scoured at 160°F for 20 minutes with a surfactant, Calgon, and soda ash at a pH of 7.2. A small amount of tannic acid should be added to the last rinse bath. Dyeing is carried out at 200°F before relustering. Relustering conditions must be established at the dyehouse.

CONCLUSION

Although we have discussed only blends of two fibers, we were forced to recommend some complicated formulations. Therefore, I want to finish with this remark. Beware of the designer who hits sometimes on some new or startling piece of imagery. Please tell him that he can make the life of the dyer utterly miserable.

ACKNOWLEDGMENTS

This paper is based on work done at General Dyestuff Company. I would like to thank all my former associates who contributed in any way to this work.

REFERENCES

(1) Am Dyestuff Reptr 41, P457 (1951).
(2) Ibid 41, P436 (1951).

DISCUSSION

Question: You have said that the wool of a blend will be seriously damaged if the blend is dyed at 250°F under pressure. Data in the literature seem to indicate that wool is damaged much less at 225 than at 250°F. Is it not likely that a combination method involving the use of a carrier like monochlorobenzene at a temperature of about 220°F would offer possibilities?

Answer: Possibly, but I have not tried it. For a temperature above 212°F, however, I would rather try dichlorobenzene, which has a higher boiling point.

Q: I believe dyeing at 220°F has been tried without difficulty.

A: I am sure wool will not be damaged at 220°F if the dyeing time is not prolonged. If more than one hour would be required for a heavy shade on Dacron polyester fiber or Orlon acrylic fiber, however, the wool would be very apt to be damaged.

Q: I rather believe that Orlon can be dyed in very deep shades in less than one hour at 220°F.

A: Yes, but the wool would be stained so much by the basic dyes that the fastness to perspiration and washing would be unsatisfactory.

III COLOR PERFORMANCE OF SOLUTION-DYED ACETATE*

A F TESI
Celanese Corp of America
Summit, N J

INTRODUCTION

SOLUTION-DYED fibers made of acetate have really attained large-scale production and economic importance only within the past two years. It is true that individual colors, particularly black, if one wishes to call black a color, have been made since 1934. However, it has been only two years since solution-dyed acetate yarns have been given trade names and actively promoted and marketed in complete color ranges. For example, Tennessee Eastman's "Chromspun" appears in the July 22nd, 1952 issue of the Official Gazette US Patent Office, while Celanese's "Celaperm" is listed in the April 17, 1953 issue of the same publication.

1953 brought considerable activity in solution-dyed fibers other than acetate. For example, at least three producers initiated their products in that year: American Enka Corporation, with filament rayon under the trade name of "Jetspun," Courtauld's, Inc, with rayon staple under the trade name of "Coloray," and Carbide and Carbon Chemical Co with "Spun-with-color" staple Dynel. Even more recently, American Bemberg announced four colors of solution-dyed filament cuprammonium rayon. There is no doubt that interest in this type of colored textile yarns and fibers will increase because they are making a definite contribution to the textile industry, and, through it, to the consumer as well.

What are the contributions being made by solution-dyed acetate? Probably the first and most important is extraordinary colorfastness of all types, not only against specific color-destroying agents, but against the wide array encountered by textile products in their normal and many times unusual uses. Let us see what are the color-affecting agents or procedures that colored textile products must encounter and withstand if they are to be considered satisfactory? They may be enumerated as follows:

Experiments have shown that, when acetate is solution-colored in the mass with good pigments, the resultant acetate fabric displays excellent (5) fastness to AATCC Wash Test #4, excellent (5) fastness to rubbing, and very good (L-6) to excellent (L-7) and maximum (L-8) light fastness. Fastness ratings for other AATCC tests are also excellent (5), such as fastness to drycleaning, perspiration, sea water, chlorinated water, and fresh water. Of great importance for acetate is excellent (5) fastness to gas fading. Solution-colored acetate has the further important advantage over uncolored bright or dull acetate of retaining its tensile strength very much better upon 275 hours' exposure to bright sunlight.

COLOR-AFFECTING INFLUENCES

Washing
Perspiration
Rub-off, wet and dry
Fresh, chlorinated-pool and sea water
Dry Cleaning
Gas Fading
Bleeding or staining of adjacent fibers
Light

There are other color hazards which the yarns in the fabrics must meet even before the fabric reaches the ultimate consumer. These are the various chemicals, solutions and processes that are used in normal mill-processing operations; I mean such solutions as hydrogen peroxide, hydrosulfide, oxalic acid, mineral acids, chlorine, etc.

In order to demonstrate the possibilities of solution-dyed acetate, we will show the results obtained from Celanese's own particular brand of solution-dyed acetate, Celaperm.

Because many of the properties are determined by the properties of the *specific pigments selected*, it should be emphasized that these results may be considered as typical but not necessarily as representing *all* solution-dyed acetate. Pigment qualities may vary as do dye properties.

EXPERIMENTAL

In order to get a complete picture of the color performance, fabrics were woven and sent to an independent testing agency for evaluation and rating, according to the AATCC rating procedures.

Table I lists the results obtained from the #4 wash test. As you can see, all colors rated Class 5-Excellent, since there was no appreciable wash-down or staining of the multifiber test cloth, a record which is quite impressive.

Table I also shows the results obtained in the regular AATCC Crocking tests, and again all of the Celaperm acetate colors earned the 5-Excellent rating.

Table I in the other columns and Table II show the results of a very comprehensive study of color performance under Fade-Ometer, Weather-Ometer, and actual-sunlight exposure tests. Here again, it must be emphasized that the type of pigment used is a very important factor in the lightfastness performance, and the results

TABLE I
FASTNESS RATINGS OF ACETATE, SOLUTION-DYED WITH CELAPERM COLORS

Colors	*AATCC Wash Test #4*	*Rubbing (Crocking)*	*Fade-Ometer (320 hours)*	*Weather-Ometer (320 hours)*
yellows	5	5	L-7 to L-8	L-7
blues	5	5	L-7 to L-8	L-7 to L-8
greens	5	5	L-8	L-8
browns	5	5	L-7	L-7
reds	5	5	L-6	L-7
pinks	5	5	L-6	L-6
roses	5	5	L-6	L-7
beiges	5	5	L-7	L-7
maroons	5	5	L-6	L-6
greys	5	5	L-7	L-8
blacks	5	5	L-7	L-7

Note: A rating of "5" is excellent (best) for all fastness properties except light and weathering, for which "L-7" is excellent and "L-8" is maximum (best).

* This paper was also presented before the Philadelphia Section on Friday, Sept 24, 1954, at the Penn-Sherwood Hotel in Philadelphia, Pa.

TABLE II

RATINGS OF SOLUTION-DYED ACETATE (CELAPERM) TO ACTUAL WEATHERING (FLORIDA)——320 HOURS

Colors	*Under Glass*	*Direct Weathering*	*Wet 100% of Time*
yellows	L-7 to L-8	L-6 to L-8	L-6 to L-8
blues	L-7 to L-8	L-7 to L-8	L-7 to L-8
greens	L-8	L-8	L-8
brown	L-7	L-7	L-6
red	L-8	L-7	L-7
pink	L-5	L-5	L-5
rose	L-6	L-6	L-6
beige	L-6	L-7	L-6
maroon	L-7	L-6	L-6
greys	L-8	L-8	L-8
black	L-8	L-8	L-8

obtained are presented as examples of what can be done with this type of product if the *rights pigments are chosen.* On the other hand, Table III shows the results obtained from actual-sunlight and outside exposure tests when red-containing pigments, sensitive to moisture plus sunlight, are employed. As you can see, the Fade-Ometer gives an *unrealistically high* result for solution-dyed acetate containing these moisture-sunlight-sensitive pigments. In some, the L-6 becomes L-3, and this is quite a drop.

Table IV shows the results obtained in the perspiration, fresh-, chlorinated-pool- and sea-water, drycleaning and gas-fading tests. These are listed together, since, in all cases, the colors received the 5-Excellent rating.

Resistance to sunlight degradation is an important consideration for a number of uses, such as curtains, drapes, outside furniture, auto upholstery, etc. Solution-dyed acetate is particularly suitable for such applications, not only because of its unusually high resistance to sunlight fading when colored with properly selected pigments, but because these good pigments can also increase the already high sunlight degradation resistance of acetate fabrics.

Table V shows the results of 275 hours' sunlight exposure under the severest of conditions. As can be seen, the solution-dyed were much superior to the undyed yarns, which are themselves somewhat better than the other common fibers listed. However, because of many varying factors, such as yarn diameter, types of finish, length of time needed to accumulate the total sun hours, humidity changes, etc, encountered in all actual sun exposure tests, the results are presented to illustrate a point and not necessarily to show the ranking of the fibers listed.

Having confined our discussion to the performance possible with solution-dyed acetate, let us see what these yarns and fibers have to offer to the fabric designer, as well as to the various segments of the textile industry. We will mention only a few.

TABLE III

RESULTS OF USING MOISTURE-SUNLIGHT-SENSITIVE RED PIGMENTS TO PRODUCE SOLUTION-DYED ACETATE

	Fade-Ometer Rating	*Direct Weathering with Fabric Kept Wet Rating*
browns	L-6	L-4
reds	L-6	L-3
pinks	L-6	L-3
roses	L-6	L-3
navies	L-7	L-4
beiges	L-6	L-4

TABLE IV

CLASS RATINGS FOR AATCC TESTS FOR
PERSPIRATION
GAS FADING
SEA WATER
DRYCLEANING
CHLORINATED WATER
FRESH WATER

All solution-dyed colors: (Celaperm) yellows, blues, greens, browns, reds, pinks, rose, maroons, beige, greys	5—Excellent rating No color change or staining of test cloth

None of the colors showed any gas fading even after 21 cycles in the gas-fading chamber.

TABLE V

SUNLIGHT DEGRADATION RESISTANCE OF FABRICS MADE FROM SOLUTION-DYED ACETATE (CELAPERM) AND OTHER FIBERS

Solution-dyed Acetate	*% Strength Retained After 275 hrs of High-Intensity Sun*
black	97
yellow	93
blue	92
red	83
Uncolored Fibers	
acetate, bright or dull	51
nylon*	38
rayon*	44
cotton*	46

* Exposed under similar but not identical conditions as the solution-dyed Celaperm acetate.

ADVANTAGES OF SOLUTION-DYED ACETATE TO THE DESIGNER

Solution-dyed acetate offers many special design possibilities. In other words, because there is available a source of uniform, extremely colorfast and inexpensive colored yarns, all of the advantages normally attributed to yarn-dyed fabrics are attainable. Color brilliance, not ordinarily possible with piece dyeing, is easily obtained. Also, almost infinite yardage of colors can be made with a uniformity not attainable by other means. Because of the development of water-insoluble warp sizing by the chemical companies, it is now possible to produce very satisfactory and economical loom-finished acetate fabrics of great beauty, which have that special hand and drape associated only with off-the-loom fabrics. Such development, as cone-over-cone plying, where the yarns from an uncolored cone are combined with one or more solution-dyed acetate yarns, is used to produce versatile and beautiful color effects economically and with a minimum of handling. Swimwear manufacturers have combined solution-dyed acetate with cotton-covered elastic yarns to give fabrics not only with great aesthetic appeal, but with a colorfastness not heretofore possible. No longer do they need to worry about bleeding or color change from fresh, sea or even chlorinated water. These are only a few examples of what has been done today; however, the inventive genius of the fabric-development expert will undoubtedly use this tool to create many more fabrics which have not only beauty and aesthetic appeal, but extraordinary color performance as well.

CONSUMER BENEFITS —— How does the consumer benefit from this product? One bonus that the consumer is receiving from solution-dyed acetate and other fibers as well is the assurance of high-quality color performance. This is so because we have here a condition where the color and, at the same time, the color performance is placed into the yarn while it is made by the yarn producer. The ultimate consumer of the colored product made from these yarns is assured of a high degree of color fastness as long as the yarn producer uses good pigments. No longer will the quality of an otherwise good fabric be degraded because the buyer and the converter may have haggled over the price of dyeing. In other words, the color performance remains in the yarn all along the line from yarn maker, weaver, converter, finisher, garment cutter, retailer and consumer. No change in color performance can take place unless there is over-dyeing or the addition of colored foreign materials.

ACETATE AND FLAMMABILITY

Because of the present great interest in the Federal Flammable Law, and because the introduction of foreign materials, such as resins and other stiffening agents, have been known to affect the rate of burning of fabrics, it is in order to state the place of solution-dyed acetate fabrics in regard to the Federal Flammable-Fabrics Act.

Public Law #88, the Federal Flammable-Fabrics Act, was enacted to protect the wearer of apparel from fabrics that burn so rapidly that they are considered *dangerously flammable*. The fabrics and wearing apparel covered under this law are not, in general, those covered by several state laws. The state laws (with the exception stated below) are concerned only with "flame-resistant" or "flame-proofed" fabrics, such as those used in public places as hotels, etc. In contrast, the Federal Law concerns only apparel and apparel fabrics which burn with extraordinary rapidity and not with those fabrics which burn at a normal rate. Public Law #88 does not concern itself with non-wearing-apparel fabrics, such as drapes, furnishings, etc.

The only state law now in effect which covers the same scope as the Federal Flammable Fabrics-Act is the California State Law entitled, "California State Minimum Safety Standards for Wearing Apparel." This law states that any fabric whose average speed of burning over the surface of the material is more than five inches in six seconds by a standard test method shall be classed as an "inflammable article." In other words, the California Law is in fact more severe than the Federal Law in that the Public Law #88 states that a fabric is considered dangerously flammable when it burns five inches in four seconds under essentially the same test*. Thus for example, a fabric which burned in the test five inches in five seconds, would be approved under Public Law #88 but would be below minimum standard under California State Law.

Napped fabrics with 100% acetate pile have passed the California Law requirements since its enactment in 1947. As a matter of fact, the following statement was issued by the California State Fire Marshal to a manufacturer of napped fabrics:

> "Please be advised that we shall accept all fabrics having a brushed surface consisting wholly of acetate as meeting the requirements of the California State minimum safety standards for wearing apparel."

In regard to other acetate fabrics, the following is significant. Celanese has run a large number of its own tests and its customers have run even more. Yet, to the best of my knowledge, we have not found any all-acetate commercial fabrics of any construction which does not meet the requirements of the Federal and the California Laws.

We have run a number of tests on the same fabrics made from undyed acetate and from Celaperm. These results show that there is no significant difference in the rate of burning as determined by the AATCC test methods. Typical results are as follows:

	Rate of Burning seconds
White all-acetate fabric before washing	10.8
Celaperm all-acetate fabric before washing	10.4
White all-acetate fabric after washing and dry cleaning	10.9
Celaperm all-acetate fabric after washing and dry cleaning	10.6

CONCLUSION

Having mentioned the AATCC tests in regard to flammability, we wish to acknowledge our gratitude to the AATCC and to the work of its research committees. For our part, we cannot see how a complete line of solution-dyed acetate could have been developed, evaluated, promoted, merchandised and sold without the yardstick of AATCC test methods to measure its performance. It was only because of these well-developed and meaningful test methods that we were assured that the results obtained had meaning in actual use. In other words, while AATCC's research committees were working diligently during the past thirty-one years to establish these test methods, I am sure that they had not anticipated that many years later, a new product would come along that depended on these test methods for its actual existence. This is merely another example of the importance of the work being carried out by the AATCC.

The more all phases of the textile industry from yarn producer to ultimate consumer supports such work, the more each will benefit.

DISCUSSION

Question: What is the effect of regular (disperse) dyeing on the loss of tensile strength of acetate yarn upon exposure to light?

Answer: We have not made any comparisons that would answer this question. Table V shows that the pigments we employed gave considerable protection, particularly in the darker shades. We do know in general that dyed acetate deteriorates in light less rapidly than undyed. Our assumption is that the disperse dyes give some protection also.

Q: You have indicated that there is no difference between the flammability of pigmented and unpigmented acetate. Is this true when the pigment is a chromate?

A: I don't know as we were not using any chromates among the colors discussed. It must be remembered, however, that the pigment content seldom runs over 2 or 3%; so, you would not expect any change from the regular acetate. We wanted to make sure that such percentages of pigment do not affect flammability as measured by the tests outlined in the Federal law, but chromates were not included.

Q: How about carbon black?

A: The same holds for that, and there is no secret that our black is carbon black.

Q: How about fastness to mill processing?

A: Our solution-dyed acetate is entirely resistant to cross-dyeing, mill scouring, and to the whole gamut of mill processing procedures.

Q: Do the pigments affect the degradation of rubber in rubberized bathing suits?

A: We select pigments that have no effect on rubber.

Q: Does acetate solution colored with pigments stain any more than uncolored acetate in cross-dyeing?

A: No, not ours.

* NOTE: Since this paper was presented, the law has been changed and the time set at three and one-half seconds.

IV SPUN-DYED VISCOSE

L L WALMSLEY
American Cyanamid Co
Bound Brook, N J

(The complete text of this paper may be found on page P790 of the November 22, 1954 issue of the American Dyestuff Reporter).

V SOLVENT-DYEING ACETATE

PAUL C DUGGAN
Celanese Corp of America
New York, N Y

Cellulose acetate, which has long been dyed mostly with disperse (acetate) dyestuffs, can also be dyed by two other methods: 1) a solvent method employing an approximately 75% solution of methyl or ethyl alcohol and 2) a solvent method employing a medium containing a mixture of organic acids with or without an addition of organic solvent and/or mineral acid. The uses, advantages, and disadvantages of these methods for convenience, fire hazard, variety of shade and resultant fastness properties are compared with those of the conventional aqueous method for disperse (acetate) dyes.

WHILE a very small proportion of acetate sold is solvent-dyed, there has been an increased interest in this type of dyeing within the past year or two.

It is possible to dye acetate yarns or fabrics with other classes of dyestuffs than disperse (acetate) dyestuffs, if a chemical is used that swells the fiber. In the choosing of a swelling agent, there are a great many factors which must be considered, including ability to dissolve dyestuffs, toxicity, flammability, availability, and cost, as well as color performance. Out of years of study and use, two general solvent techniques for dyeing acetate are of current interest: one employs an alcohol system, the other uses an acid system as set forth in the Galatioto patents.

In the former, a high concentration of alcohol in water, with or without the addition of another swelling agent, such as sodium thiocyanate, is used. The latter method uses a mixture of organic acids and sometimes mineral acid, with or without additions of organic solvents. With the alcohol system there is a mechanical absorption of the bath without exhaustion of the dyestuffs from the bath. The swelling and dyeing of the yarn is almost instantaneous at room temperature. The mixed-acid system depends on a controlled swelling of the yarn and exhaustion of the color from the dye bath, part of the control being obtained by moderate increases in temperature.

With selected disperse (acetate) dyestuffs, it is possible to obtain a range of shades with good fastness properties in practically all respects. The one weakness of full shades is in wet fastness, that is, in fastness to washing, perspiration and sea-water bleeding. Solvent dyeing in itself does not correct this condition, for if disperse (acetate) dyestuffs are applied to acetate by a solvent technique, the resulting fastness properties are the same as though the dyestuff had been applied in a conventional manner. However, by using selected acid dyestuffs or solubilized vats in medium and full shades, wet-fastness properties can be obtained that are far superior to those obtained with direct acetate dyes. These techniques have been used for many years by yarn dyers to obtain yarn for effect threads in worsteds or hosiery clocking that would stand cross dyeing.

At the present time there is considerable interest in the possibilities of piece-dyeing the acetate in a combination fabric to obtain better wet fastness properties than can be obtained with disperse dyestuffs. While solution-dyed acetate colors give adequate wet fastness, solvent dyeing is being used to get a wider range of colors as well as added flexibility. For example, users of acetate swimwear fabrics have found that the use of both solution-dyed and solvent-dyed acetate fabric is much to their advantage. By the use of solvent-dyed acetate, they can get a broader range of colors that are reasonably wet fast than is possible by the use of solution-dyed fabrics alone. In other words, they use the solution-dyed yarns for the darker shades and then fill the lighter shades with solvent-dyed colors.

As is true with all relatively new and untried procedures, there are many problems in using the solvent-dyeing technique on acetate. As the alcohol system uses a 70 to 80% solution of alcohol in water, this method presents a fire hazard. The acid system involves fumes that are very objectionable to workmen, and thus for this system protective clothing and masks, along with adequate ventilation, are essential. For economic reasons, it is necessary to conserve the solvents; storage and recovery systems are therefore needed to keep costs at a minimum.

Considerable variation in dye pickup can be had between yarns. Yarns that appear perfectly uniform when dyed with disperse dyestuffs can show distinct variations when dyed with acid or vat dyestuffs.

In any solvent system, the acetate yarn must become swollen in order to accept those classes of dyestuffs for which it does not have normal affinity, and great care must be exercised to see that the fiber is not damaged while in the swollen state, or permanent distortion will result. This means that much greater care must be exercised in handling yarns or fabrics during solvent dyeing than is needed in conventional dyeing.

Because the acid method controls the swelling and depends partly on heat for swelling, it lends itself to jig application for piece goods.

Piece dyeing by the alcohol system can best be handled on a range consisting of a pad followed by wash boxes. The usual precaution of having a uniform moisture content in the fabric to be padded is very important for solvent dyeing. This is best obtained by running the fabric over a stack of drying cans, with the last two cans water-cooled, just prior to padding.

Although the solvent dyeing of acetate-containing piece goods requires meticulous care, it is a possible means of obtaining fastness properties on the acetate that lie between those obtained with normal disperse dyestuffs and the solution-dyed yarns.

While it is not possible, in a presentation of this type, to give details for the optimum procedures and other details, I will be glad to answer any questions that time will permit.

Also, our Customer-Service Department has prepared a technical bulletin on the solvent dyeing of acetate, which can be obtained by writing to me or to our Charlotte office.

DISCUSSION

Question: Does the use of ammonium thiocyanate in the alcohol method affect the fastness properties of the dyed acetate?

Answer: Not to my knowledge.

Q: Is it not possible to substitute a higher-boiling alcohol in the alcohol method to reduce the fire hazard?

A: Yes. However so far as I know, only the alcohol process, utilizing either ethyl-alcohol or methyl-alcohol, or the mixed acid system are the only systems used commercially for acetate. Butyl alcohol and other higher-boiling swelling agents can be employed but they normally cost more and make control more difficult.

A reduced vat system has also been used for acetate, but it requires a Williams Unit to get the speed necessary for the avoidance of saponification. Further, the caustic, hydro and additional color must be spread very evenly across the space in the Williams Unit or unevenness will result.

• PATENT DIGEST •

PAUL WENGRAF

CREASEPROOFING WITH MELAMINE-FORMALDEHYDE-UREA in Strictly Controlled Proportions G,2,04

U S Pat 2,662,872 (Dan River Mills——Gagarine et al——Dec 15, 1953)

The inventors are aware that urea resins and melamine resins have been advocated frequently for creaseproofing cellulosic textiles. The known processes are said to have limited use because the tear strength generally is more or less reduced (in some instances by 50-90%).

According to the present invention the crease resistance is increased as much as 70-100% while the tear strength loss is claimed to be not more than 30%. This effect is attained by reacting one mol melamine with 6 mols formaldehyde and then with 3-4 mols urea. More formaldehyde is apt to improve the crease resistance but it impairs considerably the tensile strength; the same is true for a reduction of the urea quantity. On the other hand, the creaseproofing effect is damaged by increasing the urea amount.

To prepare the resin one mol melamine is first reacted with 6 mols formaldehyde to produce hexamethylolmelamine, and this intermediate is further condensed with 3-4 mols urea. The examples suggest the use of etherified methylolmelamine, for instance, of the dimethylether. Substitution of urea by dicyanodiamide is within the scope of this process.

A large part of the specification (col 5-7) is devoted to a theoretical explanation of the specific effect attained in the current method. It is assumed that generally one resin molecule may *react with two or more cellulose molecules* forming a fairly rigid tridimensional network that gives resistance to bending but does not allow the cellulose fibers to distribute the stresses, consequently the tensile strength is lowered. The purpose of the present invention is to make the resin cross linkages between the cellulose molecules longer and *more flexible*, to maintain the crease resistance, and to regain at the same time some of the loss in tear resistance and tensile strength. Schematic formulas to illustrate and prove this theory are presented.

Among the references cited by the Patent Office:

U S Pat 2,545,450 (Pacific Mills/1951): stabilizing wool by impregnating with a methylolmelamine - formaldehyde precondensate, exposing thereupon to infrared radiation and curing [cf *Am Dyestuff Reptr 40*, 537 (1951)].

U S Pat 2,504,857 (Bancroft/1950): imparting crease resistance to cotton by treating with an aqueous solution of methylolmelamine and methylated methylolmelamines, drying and curing [cf *Am Dyestuff Reptr 39*, 524 (1950)].

U S Pat 2,466,457 (Am Cyanamid/1949): shrinkproofing textiles with mixtures of alkylated methylolmelamine and urea (or thiourea) as formaldehyde binding agents [cf *Am Dyestuff Reptr 38*, 563 (1949)].

U S Pat 2,456,568 (Monsanto Chem/1948): obtaining resins for textile treatment by condensing monoalkylated methylolmelamines with thiourea and formaldehyde.

CELLULOSIC MATERIAL ——Antimony-Titanium Solutions plus Organic Solvent G,2,03

U S Pat 2,668,784 (Du Pont——Dills——Feb 9, 1954)

The preamble to this specification refers to the copending U S Patents 2,570,566 [cf *Am Dyestuff Reptr 41*, 87 (1952)] and 2,607,729 [*ibid 42*, 214 (1953)], which deal with flameproof impregnations for cellulose material, especially textiles. These comprise a treatment with a stable monobasic (hydrochloric) acid solution of antimony and titanium followed by neutralization. Although they have proved to be successful, it has been observed that only 50% of the oxides so formed remain in the fibers, while the other half contained in the interstices of the fabric and precipitated by neutralization is washed out in subsequent laundering procedure. This disadvantage is felt particularly in a treatment of closely packed yarns, where the precipitated adherent hydroxides cannot easily be washed out, thereby frequently causing light-colored patches to form on dark materials.

The object of the current invention, a modification of the above, is to overcome these drawbacks and to provide compositions that penetrate even *yarn packages* well, thereby resulting in a flameproof finish that is resistant to laundering.

It has been observed that flame-resistant properties become unsatisfactory when the concentrated Sb-Ti solutions are simply diluted in order to increase the penetration. Surprisingly, however, dilution with a water-soluble, volatile organic solvent that boils below 100°C or forms azeotropes with water, evaporating within these temperature limits, produces the effect desired. Organic solvents to be used in this method comprise alcohols, esters, ketones or nitriles with a chain length up to C_6. The examples refer mostly to isopropanol, optionally blended with tert butanol. One liter of the concentrated solution of Ti-Sb (as mentioned in the copending patents) is mixed with about 5 - 240 pbw of the organic liquid. The material is immersed in this mixture, squeezed, exposed to air, slightly warmed or dried on drums and preferably aged, and finally neutralized with soda ash or ammonia. The chemistry of this reaction is not quite understood. The inventor assumes a certain swelling influence on the cellulosic fiber; it appears that the dilute solution penetrates the material to the same degree as a concentrated solution. However, when the alcohol evaporates by heat, the aqueous phase concentrates to its previous strength within the fibers, utilizing all the oxides present after neutralization.

An example refers to the impregnating of a strip of cotton herringbone twill with a solution of 160 g titanium dioxide, 292 g antimony trioxide, 32 g zinc oxide and 11 mols hydrochloric acid per liter, diluted with 10 p water and 10 p isopropanol. An analysis proves that, after evaporation and neutralization, about 90% of the reagent has been utilized. The effect is resistant to a large series of washing cycles, even to "Sanforizing". Another example points out that rayon carpet yarns, wound in package form, show even distribution of the impregnating oxides in inside-and outside layers.

Among the references cited by the Patent Office:

U S Pat 2,570,566 (Du Pont/1951): flameproofing with titanium-antimony solutions in inorganic monobasic acids [cf *Am Dyestuff Reptr 41*, 87 (1952)].

U S Pat 2,343,186 (Hopkinson/1944): fireproof masses or films are obtained by impregnating with flameproofing salts distributed in a solvent of the "Cellosolve" type and stirring into an excess of a plasticizer, eg, tricresylphosphate.

• Sill Industries Guarantees Performance of All Heating Equipment

Sill Industries, Maplewood, N J, has announced that installations of its gas and electric processing heaters henceforth will carry a complete guarantee of satisfactory performance.

Sill Electric Radiant Heaters, as well as Carbomatic Corporation's gas-fired heating units are all included in the guarantee. This equipment is employed chiefly in wet finishing operations for curing resins, stabilizing synthetics, curing pigment colors and all types of drying operations.

"Six years ago," according to H N Bross, president, "Sill pioneered the stabilization of nylon fabrics with radiant heat. Three years ago it was the first to polymerize resins with radiant heat. Last year it successfully started the curing of pigment colors with radiant heat. All these are most successful operations.

"Making capital of this wet-processing knowledge, Sill is backing this textile 'know-how' unconditionally in the field of finishing operations.

"That background of experience has led the company to issue an unequivocal guarantee on all installations.

"When finishers ask for a drying speed of 60 ypm," Mr Bross stated, "they now get a speed of 60 ypm. When they ask for a satisfactory curing of silicones or crease-resistant resins on all types of fabrics, they get a satisfactory cure based upon the percentage of resin retention, the hand of the cloth and similar factors based on TBL standards.

"Three years ago we first preached the importance of padding, drying and curing in range. This not only produces better quality cloth but it is essentially economic because it cuts handling costs.

"The idea did not sell readily because many could not conceive a complete cure on the delivery end of the tenter frame in less than ten seconds.

"Today, our cures on tenter frames are commonplace in big plants and small. Our similar curing operations on Schreiners or embossing and friction calenders were undreamed of, or distrusted, three years ago. It is a pleasure to see the industry accept these precepts of ours. Therefore, we believe a guarantee of performance is simple insurance to the industry and good business practice all around.

"We trust that others will follow the lead we have taken to better serve the industry in this specialized field of heat processing."

Having completed a one-year tour with the U S Air Force "Chemistry Flies" Exhibit, the display pictured above is now being made available on loan to chemical and allied companies. Depicting the chemical industry's contributions to the health, welfare and security of the nation, the display measures approximately 8' x 8' x 2'. It is available through the office of the Information Coordinator, Synthetic Organic Chemical Manufacturers Association, 41 East 42nd Street, New York 17, N Y.

• Smith-Drum Announces New Agreement

Smith, Drum & Company, 423 West Allegheny Avenue, Philadelphia 33, Pa has an agreement with Teinturerie de Groeninghe under which they have been licensed the rights to supply the Static Process Steverlynck on the Smith-Drum High-Pressure-Dyeing Machines. The design and fabrication of the Smith-Drum machines will be as developed by them several years ago with the additional provision that the Steverlynck Process, which includes an over-pressure chamber, may also be supplied.

• CCA to Establish Development Labs in Charlotte

Celanese Corporation of America, in support of expanding markets for its fibers in apparel, household and industrial applications, will shortly establish new development laboratories in Charlotte, N C, which will serve as a link between fiber research at the Summit, N J, laboratories and commercial production at fiber plants.

A 114-acre site of land, two miles from the present headquarters of the Textile Division, has been acquired for the erection of the facilities. Although the first section of the building is scheduled to be in operation before the end of 1955, the full extent of the undertaking will not be realized for several years.

• Hoerig, Richardson Address Quebec Section, CATCC

Members of the Quebec Section, Canadian Association of Textile Colourists and Chemists were told last month that facilities for basic research of great importance to Canada's textile industry will be provided by a new $1,500,000 research laboratory now under construction at Kingston, Ont, by Du Pont Company of Canada Ltd.

H F Hoerig, manager of the Department of Research and Development of Du Pont of Canada and one of the speakers at a regular meeting of the Section in the Physical Sciences Center of McGill University, gave some details of the new laboratory and the company's research organization. He stressed that basic scientific research without specific commercial objectives was of great importance in the textile field where in recent years there has been rapid development of new fibers and fabrics and of new uses and processes for the older fibers.

Francis S Richardson of the Waldrich Company, Delawanna, N J, described latest development in the field of high-temperature dyeing of textiles. He said that, in his opinion, new dyes suitable for use with the newer fibers at low temperatures were not yet in sight and that textile scientists and technicians should become well acquainted with the machinery and the techniques now available for dyeing at high temperatures.

• Klug Named as Fielden Representative

Fielden Instrument Division of Robertshaw-Fulton Controls Company has appointed H J Klug Company sales representatives for Nebraska and Western Iowa.

The division is a producer of industrial instrumentation and electronic control devices, and is one of seven manufacturing divisions of Robertshaw-Fulton.

H J Klug Company is located at 2029 North 67 Avenue, Omaha.

• National Aniline to Manufacture Diisocyanates

National Aniline Division, Allied Chemical & Dye Corporation, has started construction of facilities for production of diisocyanates in introductory commercial quantities at its Buffalo Plant. The new installation is expected to be on stream shortly. All raw materials needed for the production of diisocyanates will be provided by various divisions of Allied Chemical.

Products to be produced will include 2,4-tolylene diisocyanate, various mixtures of isomeric tolylene diisocyanates (TDI), 3,3' bitolylene 4,4' diisocyanate (TODI) and p,p' diphenylmethane diisocyanate (MDI). Experimental quantities of these materials will be made available from smaller semiplant facilities also located in Buffalo.

• Du Pont Awards Textile Project to NCSC

The Du Pont Company has awarded a major project in textile fiber research to the School of Textiles, North Carolina State College. In a two-year study the college's Department of Textile Research will develop comparative data on Du Pont's five man-made fibers for the engineering of fabrics in specific end uses.

The physical properties of each of the fibers — rayon, acetate, nylon, "Orlon" acrylic fiber, and "Dacron" polyester fiber —will be measured under a wide range of conditions of temperature and humidity. Tests will be conducted on filament yarns and staple. They will include measurements of properties under various loads, properties under impact, moisture content, stress-strain behavior, work and tensile recovery, properties after exposure to various chemicals, and properties after exposure to heat.

The research project will be supervised by John F de Bordenave and Donald J Bringardner of the customer service section, Du Pont Company's Textile Fibers Department. William T Waters, of the Department of Textile Research, N C State College, will conduct the program under the direction of J F Bagdan, director of processing research at the college.

NAMES IN THE NEWS

Russell

KENNETH C RUSSELL has been elected president of Nuodex International, Inc, a subsidiary of Heyden Chemical Corporation.

Nuodex International serves as the export agent for a number of leading American chemical companies.

Mr Russell has been vice president of Nuodex International for the past two years and served as export manager from 1952 to 1953.

M M McCANN, technical representative for Warwick Chemical Co in Virginia and North Carolina since 1936, has left to join Synthron, Inc in a similar capacity. He replaces ALLEN W TAYLOR, who has resigned from Synthron to become general manager of Burlington Mills' Altavista Plant.

Mr McCann, prior to his association with Warwick, was affiliated with Burlington Mills, for whom he erected the first finishing plants in 1931 and 1934. These plants were known at the time as Plant B, which was entirely a jig operation, and Plant A, which was a box operation and which was later consolidated with Armco Finishing Plant in Burlington.

McCann

JOHN A LORITSCH has been promoted from the post of manager — alkyds engineering to the managership of the G-E Chemical Materials Department's Alkyd Products Plant at Schenectady, N Y. The Alkyd Products operation is one of three plants operated by General Electric Company's Chemical Materials Department.

Dr Loritsch has been with GE since 1940, following service as a chemist with Rohm & Haas Co.

Goll

MILTON GOLL, former chief of the Microbiological Laboratory of Nuodex Products Company, Inc, Elizabeth, N J, has announced the establishment of Milton Goll Associates, 103 West Northfield Road, Livingston, N J, to act as special representative for Scientific Oil Compounding Company, Inc, Chicago, Ill, and to represent other basic manufacturers of fungicides, bactericides and antimicrobial agents for the textile, paint, plastic and adhesive industries.

Prior to his connection with Nuodex, Mr Goll was chief bacteriologist of Schwarz Laboratories, Mt Vernon, N Y.

Price

DONALD PRICE, whose entry into the consulting field was recently announced, has been named to advise American Alcolac Corp, Baltimore, Md, in the sales of their detergents to cleaning compound manufactures.

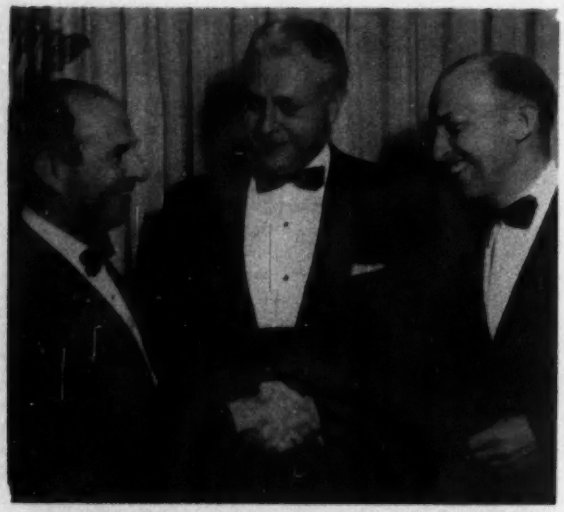
WERNER F GOEPFERT has been appointed personnel manager of Interchemical Corporation's central research laboratories in New York City.

Mr Goepfert was previously in charge of raw materials survey group and has also done considerable product development work. He has been with Interchemical since 1939.

WILLIAM L SCOTT succeeds Mr Goepfert as head of the raw materials group, with which he has worked during most of his seven years with Interchemical.

Goepfert

PAUL J PERNICE, formerly technical salesman and chemist in the Philadelphia territory, has been named to head up the Portland, Ore, office of General Dyestuff Co and Antara Chemicals. He will cover the Oregon, Washington, and Idaho territory.



PTI ALUMNI BANQUET PRINCIPALS——(L to r): Milton Harris, head of the Harris Research Laboratories, Washington, D C, greets Leon P Brick, Onyx Oil & Chemical Co, president of the Philadelphia Textile Institute Alumni Association, as Bertrand W Hayward, PTI president looks on. All three had major roles in the 54th Annual Philadelphia Textile Institute Alumni Banquet, which was held February 4th at the Warwick Hotel, Philadelphia.

Dr Harris, the principal speaker, told the 200 attending alumni that "the textile industry needs more creative people if it is to progress in the future." Mr Hayward spoke briefly about the tremendous progress the college has been making during the past few years, emphasized the need for increased funds for the development program, and spoke of the part alumni can play in encouraging top quality boys and girls to enter college and textile industry.

Mr Brick acted as toastmaster, and Peter J Osborne, R C Osborne and Co, served as dinner chairman.

CHARLES F SCHAUMANN, a pioneer in the early development of the American dye industry, has retired on pension after a career of 36 years with the Du Pont Company.

Technical manager of Du Pont's dyes sales division for the past 23 years, Mr Schaumann is an authority in the application of dyes. A native of New York, he attended Pratt Institute, Brooklyn, N Y. In 1909 he became a laboratory assistant, and subsequently salesman, with the dyestuff importing firm of Kalle and Company, Inc, of New York, where he remained until called into naval service in 1917. On leaving the Navy, he joined the Newport Chemical Works, Inc, at Passaic, N J, where he soon was put in charge of the service application laboratory. He became technical manager in 1924 and continued in this position after the consolidation of the Newport company with Du Pont in 1931. He was transferred to the Wilmington sales office for dyes in May, 1932, and shortly afterwards became technical manager of the dyes sales division.

He is a member of the Wilmington Country Club and a charter member of the American Association of Textile Chemists and Colorists.

Mr and Mrs Schaumann, the former Marguerite Euler of Brooklyn, have two daughters, Mrs Wilda S Williams of Greensboro, N C, and Mrs Janice S Bell of Philadelphia, Pa. The Schaumanns live at 804 Berkeley Road, Wilmington.

JAMES P TALLEY has been added to the Chemical Materials and Products Development Division of The Goodyear Tire & Rubber Company, Akron, O.

He will specialize in technical service work on Goodyear's Pliovic and Pliolite latices, and be concerned primarily with coatings and latex formulations and basic polymer evaluation.

M E BRETSCHGER, president and division manager of the Becco Chemical Division, Food Machinery and Chemical Corporation, has announced new titles for key personnel of the division: F A GILBERT, vice-president and assistant division manager; J F SHEA, vice-president in charge of sales; and W J WETZEL, controller.

Although responsibilities remain unchanged, the new titles reflect present individual activities resulting from merger of the Buffalo Electro-Chemical Company, Inc and the Becco Sales Corporation with Food Machinery and Chemical Corporation, reported early this year.

Dr Bretschger and Mr Gilbert are also vice-president and assistant secretary, respectively, of Food Machinery.

GERARD B MEYNELL was named advertising manager of American Cyanamid Company's Organic Chemicals Division and Pigments Division. He replaces ERNEST K HUNT who was recently named public relations manager for the company.

Mr Meynell, who was assistant advertising manager of the two divisions since they were formed in late 1953, had earlier been assistant advertising manager of the former Calco Chemicals Division.

The appointments of ALBERT P GAGNEBIN as assistant manager of the Nickel Sales Department and of EDWARD B BITZER as assistant manager of the Nickel Alloys Department have been announced by The International Nickel Co, Inc.

At the same time the company announced that KEITH D MILLIS has been placed in charge of the Ductile Iron Section of the Development and Research Division.

VERNON C ROBINSON has joined the Company's Development and Research Division as a member of the Twin Cities Technical Field Section at Minneapolis, Minn.

WARREN B STANTON has been named assistant to the manager of Wyandotte Chemicals' New Products — Organic Chemicals Department, Michigan Alkali Division. He was formerly resident salesman in New England.

In his new position, Mr Stanton will help facilitate the transfer of products from the research and development division . . . assisting the introduction of new organic products to industry.

Mr Stanton joined Wyandotte's sales team in 1950 and has been working out of the New York office since that time.

Gennady M Kosolapoff (center), professor of organic chemistry at Alabama Polytechnic Institute, is shown examining an experimental sample of flame-resistant cotton fabric produced at the Southern Regional Research Laboratory at New Orleans, La. With him are (left) J D Guthrie and J D Reid, members of the SRRL staff engaged in the development of flame-resistant cotton fabrics. Dr Kosolapoff, who was recently appointed a collaborator of the Southern Laboratory, met with Laboratory scientists to review and evaluate the research program of the Laboratory in this field.

NEW PRODUCTS AND DEVELOPMENTS

• AAP Expands Amacron Line for Dacron Sportswear

In line with the popular acclaim with which Dacron is being accepted as a sportswear fabric, American Aniline Products, Inc, New York, has announced the addition of Amacron Yellow RLS and Amacron Orange GLS to its line of Amacron dyes for Dacron.

The new colors fall between the Amacron Yellow LS and Amacron Orange LS, which along with Amacron Red BLS, Amacron Red Violet LS and Amacron Blue RLS, comprised the initial range of shades.

The Amacron dyes are said to be particularly well suited to the sportswear application because of the excellent fastness to light and resistance to rugged washing which they exhibit on this fiber.

AAP points out that, with this complete range of shades, it is possible to produce all of the popular mode shades because of the mutual compatability which these colors exhibit one for the other.

Technical data and samples are available from any of AAP's branch offices.

• Procol PW; Kalex G

The Hart Products Corp, 1440 Broadway, New York, has introduced Procol PW, a new surfactant, and Kalex G, a sequestering agent, to the trade.

Procol PW, a condensation product of degraded protein and fatty acid, is said to be odorless, light colored, and of maximum efficiency. It reportedly combines excellent protein-inherent protective and dispersing properties with soap-inherent detergent capacities, without producing the disadvantages usually associated with soap. Procol PW is said to be stable to bleaching powder, hypochlorite and peroxide solutions, and is used in such solutions to give controlled bleaching action. As a result, it is claimed that bleach fabrics showing greater tensile strength may be obtained with the new detergent. Procol PW reportedly is well suited for vat, naphthol, and acetate dyeing because of its high dispersing level.

Kalex G displays a high sequestering power for heavy metal ions, such as ferric iron, nickel, cobalt, copper, zinc, manganese, etc, but it is not recommended for the sequestration of alkaline earth ions. On a solids basis, Kalex G is said to show the following chelating power per gram:

Metal	*Grams Sequestered*
Nickel	0.44
Cobalt	0.62
Zinc	0.38
Copper	0.52
Ferric Iron pH = 7	0.90
Ferric Iron pH = 9	1.3
Ferric Iron pH = 11	1.7

• Dacro-Dye

Metro-Atlantic, Inc, Centredale, R I, has introduced Dacro-Dye, a newly developed carrier for the dyeing of Dacron polyester fibers with dispersed-type dyestuffs.

Dacro-Dye is described as a free-flowing, self-emulsifying product with especially high shelf life. It is said to be highly efficient and extremely economical. Toxic effects with this product reportedly are at a minimum.

The manufacturer feels that Dacro-Dye is the most efficient dyeing assistant developed to date. It is said to yield high color values and to give fuller and more even shades.

• Emkasorb

A new product specifically formulated to increase the absorbency of nylon knit hose or fabric — particularly those knit materials made from stretch yarns — was introduced to the trade recently by Emkay Chemical Co, Elizabeth, N J.

Named Emkasorb, the chemical is a combination leveling agent, softener and rewetting agent. It is said to be readily soluble in warm water, and to be ideal either as a dye assistant and softener, or in the final rinse bath after dyeing. 3% of Emkasorb is said to give hose instantaneous moisture absorption after drying.

The manufacturer states that Emkasorb is highly resistant to acids, and, when used with acid colors, it contributes materially to level dyeing. It is also said to be resistant to aftertreatment with tannic acid and tartar emetic.

• Roboid

Roboid, a mildew and rot preventive which is handled in this country by Charles Dilke & Co, San Francisco, Calif, continues to be touted by its backers for use on awning material, fish and clothes lines, fish nets, etc.

The product is a clear, nongummy solution designed to withstand the attack of bacteria, moulds and fungi. It is said to be completely insoluble in water, and its effect permanent.

Dilke reports that pieces of untreated rope and Roboid-impregnated rope were submerged in both water and mud for 91 days. At the end of that time, it is claimed, the treated samples showed "no appreciable effects," while the untreated was "almost completely disintegrated."

Charles Dilke & Co is the exclusive agent for James Rowbottom, Ltd, Manchester, England, manufacturers of the chemical.

• Xynosolve

Onyx Oil and Chemical Co, Jersey City, N J, announces that their new dye solvent, Xynosolve, has many valuable functions in textile dyeing and printing. Some of the advantages in using this product are said to be as follows: increases penetration; improves dispersion of pigmented particles; increases color yield; gives smoother prints even on difficult fibers; improves solubility of dyes of low solubility; improves working properties of print pastes; improves the results in aging and steaming, and economies of all types of humectants.

• Dextrol GM-94

Dextrol GM-94, a nonionic softener said to have no wetting or rewetting properties, has been announced by Dexter Chemical Corp, New York.

The new softener is designed specifically for use with water repellents of both permanent and nonpermanent types and the company claims that GM-94 does not affect the spray rating of fabrics. Goods may be softened prior to application of the water-repellent finish or GM-94 may be mixed with the repellent.

At the same time, it is said that GM-94 is an effective softener for rubber latex backing material, producing a more pliable film when mixed with rubber latices.

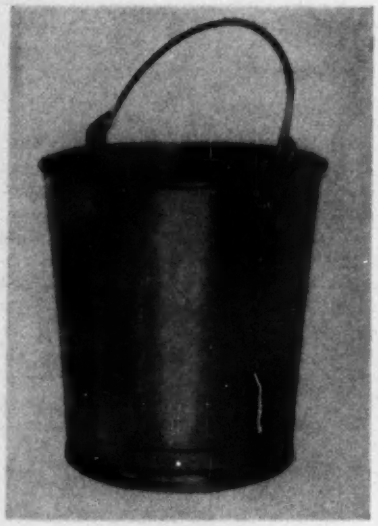
The new softener is said to have a high resistance to salt, acids and alkalies and will not develop odor or color in storage of treated fabrics.

Dexter recommends the following formulas: when used directly in the water repellent, 12 to 24 pounds of Dextrol GM-94 to 100 gallons of the mix; for mixing with latices, 30 to 60 pounds of GM-94 to 100 gallons of latex mix, and when padded on treated or untreated goods, 16 to 25 pounds in 100 gallons of water.

• Syncap ON

Syncap ON, a resin designed for application on nylon for the production of durable stiff finishes, is finding wide acceptance, according to Crown Chemical Corp, Providence, R I, manufacturers of the product.

Chief acceptance is said to be in the production of taffetized or parchmentized effects, and the product is known to impart unusual characteristics to marquisettes and sheers. It is claimed that the processing of nylon fabrics with Syncap ON insures maximum flame resistance.



Metalsmith SS Pail

• New Welded Stainless-Steel Pails

Metalsmith, 560 White St, Orange, N J, has introduced a new line of stainless steel pails fabricated by a welding method which is said to produce smooth surfaces inside and out and to equal seamless or spun types at lower cost. The pails are entirely stainless construction; no solder is used. They are made of 24-gauge type-304 stainless, with heavy duty stainless-steel handles, ears and chimes. Edges are reinforced with heavy stainless-steel wire for rigidity. Sizes available are 10, 12, 14, 16 and 20 quart. Bulletin and prices available from the manufacturer on request.

• New Attachments for Difference Colorimeter

A series of new accessories, for use with the Model C "Color-Eye" Difference Colorimeter, has been announced by Instrument Development Laboratories, Inc, Needham Heights, Mass. Ten narrow-band interference filters of approximately equidistant visual wave-lengths comprise the abridged spectrophotometer, used in metamerism studies, development of starting formulae, and general laboratory use. A new viewer attachment permits visual inspection of samples exactly as they are presented to the optical system of "Color-Eye," thereby simplifying presentation problems with directional reflectance samples and samples of dark color. Also available is a pair of neutral density filters which are said to increase the instrument's precision when measuring samples in the low reflectance region relative to stable white reference standards. A series of new sample holders are specifically designed for optimum presentation of samples in the textile, paint and plastics industries.

Measurements of color differences with "Color-Eye" are based on direct readings of intensity differences of standard ICI tristimulous components. The data obtained is readily converted to standard quantitative color notation. Comparison samples may be illuminated diffusely or directly by either artificial light or simulated daylight, reflectance or transmission. Surface gloss components are excluded or included as desired. The flicker photometer viewing system is used in conjunction with a computing network which recreates the logarithmic characteristic of the human eye for sensitivity to low light levels.

• Viscosity Conversion Chart

A chart which provides a quick, convenient means of translating any viscosity measurement into seven other standard units has been released by the Nopco Chemical Company.

Methods of measuring viscosity vary from industry to industry and, even in the same field, from one company to another. This novel conversion nomograph has been designed to minimize the problems caused by the lack of standardization by providing a means of rapidly converting from one system to another.

The chart is available free of charge by writing to Dept VC, Nopco Chemical Company, Harrison, N J.

YOUR attention is called to the fact that the illustration used in conjunction with the article on Wiesner-Rapp's 3-Way Reel (cf page 94 of our January 31st issue) was printed upside down. The illustration is correctly reproduced below:

Wiesner-Rapp's 3-way reel

GENERAL CALENDAR OF COMING EVENTS

AMERICAN SOCIETY FOR TESTING MATERIALS
1955 Annual Meeting—June 26-July 1, Chalfonte-Haddon Hall, Atlantic City, N J.

CANADIAN ASSOCIATION OF TEXTILE COLOURISTS & CHEMISTS (Quebec Section)
Symposia: Mar 18, Apr 15 (Ciba Company's Conference Room, Montreal, Que).
Regular Meeting: Mar 19 (McGill University, Montreal, Que).
Other events: (all at the Sheraton-Mount Royal Hotel, Montreal): Apr 21-23 (Textile Exhibition); Apr 22 (19th Annual Meeting); Apr 23 (19th Annual Dinner); June 18 (Annual Golf Tournament).

DELTA KAPPA PHI FRATERNITY
1955 Annual Convention—April 29-30, Lowell, Mass.

DEUTSCHE GESELLSCHAFT FUR CHEMISCHES APPARATEWESEN
Achema XI—May 14-22, Frankfurt am Main, Germany.

DRYSALTERS CLUB OF NEW ENGLAND
Apr 29 (Hotel Vendome, Boston, Mass); June 24 (Outing—Wachusett Country Club, W Boylston, Mass).

THE FIBER SOCIETY
Spring Meeting—May 4-5, 1955, Alabama Polytechnic Institute, Auburn, Alabama.
Fall Meeting—Sept 8-9, 1955, Massachusetts Institute of Technology, Cambridge, Mass.

INSTITUTE OF POLYMER RESEARCH
Symposium: Apr 2 (Polytechnic Institute of Brooklyn, Brooklyn, N Y).

INTERNATIONAL TEXTILE EXHIBITION
2nd Exhibition—June 25-July 10, 1955, Brussels, Belgium.

INTERNATIONAL WOOL TEXTILE RESEARCH CONFERENCE
September, 1955—Sydney, Melbourne, and Geelong, Australia.

INTER-SOCIETY COLOR COUNCIL
24th Annual Meeting—April 6, Skytop, Hotel Statler, New York, N Y.

NATIONAL ASSOCIATION OF HOSIERY MANUFACTURERS, KNITTED OUTERWEAR ASSOCIATION, THE UNDERWEAR INSTITUTE
42nd Knitting Arts Exhibition—April 25-29, Convention Hall, Atlantic City, N J.

NATIONAL COTTON COUNCIL OF AMERICA
1955 Chemical Finishing Conference—Sept 20-21, Chalfonte-Haddon Hall, Atlantic City, N J.

PHI PSI FRATERNITY
Annual Meeting—April 14-16, Beaconsfield Hotel, Brookline, Mass.

SOUTHERN MUNICIPAL AND INDUSTRIAL WASTE CONFERENCE
4th Annual Conference—Mar 31-Apr 1, College of Engineering, Duke University, Durham, N C.

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION
Apr 13, May 11, Sept 14, Oct 11, Nov 9 (Hotel Commodore, New York, N Y); June 9-11 (Outing———The Greenbrier, White Sulfur Springs, W Va).

TAPPI (Metropolitan District)
Apr 12, May 10 (Fraunces Tavern, New York).

TRITON GR-5

THIS NEW WETTING AGENT

ALSO GIVES YOU HIGHLY

EFFECTIVE REWETTING

EVEN AFTER PROLONGED

FABRIC STORAGE

TRITON GR-5 is not only soluble in water in all proportions but is stable—particularly to lime and magnesium salts—and electrolytes. And TRITON GR-5 is economical, too. But that's only half the story.

TRITON GR-5 is an excellent *rewetting* agent. It wets back after it has dried into the fabric, permitting high absorption under normally difficult conditions, and maintaining fabric absorbency through prolonged storage.

What's more, TRITON GR-5 puts a real sales feature into towelings. They are extra absorbent *when new*—don't need usual pre-use washings housewives complain about.

CONSIDER THE SPECIAL FEATURES OF THIS ECONOMICAL NEW WETTING-REWETTING AGENT; THEN CALL YOUR NEAREST ROHM & HAAS OFFICE.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

TRITON *is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.*

Softness YOUR PROBLEM WITH *Water Repellents?*

Dextrol GM 94, new non-ionic softener without wetting or re-wetting characteristics, produces improved hand on treated fabrics without lowering spray rating. Write us for data sheet on this vitally needed product.

TEXTILE CHEMICAL DIVISION OF
dexter CHEMICAL CORP.
New York 59, New York
Boston—Charlotte—Atlanta—Greensboro—Buenos Aires

CLASSIFIED ADVERTISEMENTS

Advertisements in this section are restricted to HELP WANTED—POSITIONS WANTED—EQUIPMENT wanted or for sale. Rates, effective February 1, 1954: One-time, $10.00 per column inch; 3 consecutive times (same copy), $9.00 per column inch; 13 or more times, $8.00 per column inch; Position Wanted, $2.00 per column inch. Figure 38 average words per column inch. Publisher reserves the right to reject or discontinue any classified advertisement. Replies should be addressed: Box Number . . , c/o American Dyestuff Reporter, 44 East 23rd Street, New York 10, N. Y.

ABSTRACTING SERVICE—Abstracting and digesting of foreign patents and periodicals. Literature review and special reports in dyestuff and cellulose chemistry. PAUL WENGRAF, 88-36 ELMHURST AVENUE, ELMHURST 73, NEW YORK.

WANTED: Physicist or Physical Chemist, 3 to 5 years' experience in colorimetry and spectrometry. To develop methods and direct spectrophotometric analyses of dyestuffs, pigments and textile materials and to interpret results for use in solution of research problems. This is a permanent position in Celanese's modern, well-equipped laboratories in Summit, New Jersey, a residential suburb within 30 miles of metropolitan New York City. Please send resumes, including salary desired to—Mr. J. A. Berg, Celanese Corporation of America, Morris Court, Summit, N. J.

PLANT CHEMIST OR DYER'S position wanted by chemist with diversified background in dyeing and finishing synthetics. Have experience as laboratory director, dyer, finisher and assistant superintendent. Prefer metropolitan New York, northern New Jersey, or abroad. Write Box No. 830.

POSITION WANTED: L.T.I. graduate. Over 15 years' experience in dyestuff industry in sales, service and management. Desires responsible position requiring administrative and technical ability. Write Box No. 844.

DYER OR ASSISTANT DYER WANTED, with background in dyeing skein yarn and/or sweater piece dyeing. Write Box No. 838.

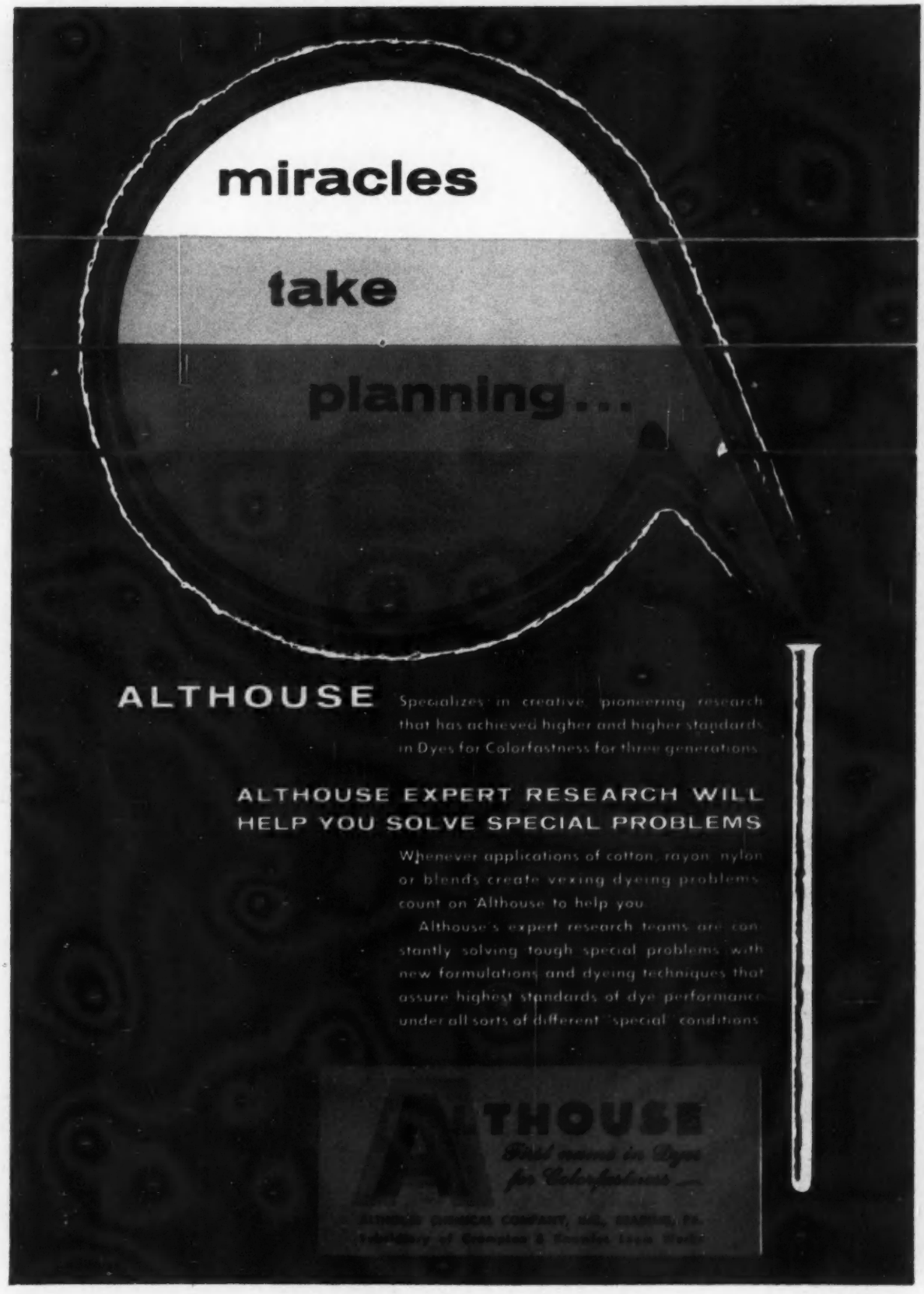
SALESMAN WANTED: For North and South Carolina and Virginia to sell detergents, softeners, resins and scouring agents to textile mills. Must know the mills and be experienced. Write Box No. 858.

POSITION WANTED: TEXTILE CHEMIST AND COLORIST. Expert in laboratory standardizing and testing of all classes of dyes on all fibers, dyeing, and printing. Experienced in technical sales and plant trouble shooting. Expert color matcher. Write Box No. 857.

POSITION WANTED: Pigment-emulsion consultant. Extensive experience in textile pigment printing. Seeks dyestuff or textile chemical manufacturer who is interested in water-phase pigment printing. Offers a complete line of colors and auxiliaries. Write Box No. 843.

TEXTILE COLORIST WANTED: For a dyestuff manufacturing plant located in New Jersey. Should be thoroughly acquainted with laboratory procedures for the testing of dyestuffs. Preferably with standardization experience. Please submit complete resume and salary requirements. Write Box No. 852.

SALES REPRESENTATIVE—Large basic chemical manufacturer having progressive Textile Chemical Division, requires two additional salesmen, one for the New York area and one for the South. This is an unusual opportunity for a technically trained, personable, experienced salesman. Reply fully and in confidence, giving education, training, experience and accomplishments. Our staff are aware of our expansion program. Write Box No. 859.


miracles
take
planning...
ALTHOUSE
Specializes in creative, pioneering research that has achieved higher and higher standards in Dyes for Colorfastness for three generations
ALTHOUSE EXPERT RESEARCH WILL HELP YOU SOLVE SPECIAL PROBLEMS
Whenever applications of cotton, rayon, nylon or blends create vexing dyeing problems, count on Althouse to help you.
Althouse's expert research teams are constantly solving tough special problems with new formulations and dyeing techniques that assure highest standards of dye performance under all sorts of different "special" conditions.
ALTHOUSE
Field names in Dyes for Colorfastness

Seyco agents add a new luster to Mercerizing

SEYCOPEN 88, is blended of quality-controlled cresol and additives, gives rapid uniform wetting of mercerizing caustic without foaming, settling, separating; trouble-free!

SEYCOPEN 1712 has all the rapid-wetting, uniform-absorbing properties of cresylic-type agents, and is harmless to the skin. Has pale straw color, pleasant odor.

SEYCOPEN 1728 is effective over a wider range of caustic concentrations.

None of these mercerizing agents will cause any difficulties in caustic recovery systems. Our non-cresylic agents even retain most of their wetting power!

For more information, write, wire or call, giving your specifications.

Headquarters for Textile Chemicals

SEYDEL-WOOLLEY & CO.

748 Rice Street, Atlanta, Georgia

● Classified Advertisements ●

CHEMIST—for plant and laboratory work on synthetic piece goods. Metropolitan area. Write Box No. 860.

RESEARCH CHEMIST — Progressive company in western New York with expanding Research and Development group requires man with B.S. or M.S. degree in Chemistry. Opportunity for advancement. Prefer man with some experience in textile field. Age 25 to 35. Send reply, in full confidence, giving details on personal backgrounds, education, experience, and salary requirements. Write Box No. 861.

DYER WANTED: Full charge, thoroughly experienced in synthetic knitgoods. Write Box No. 862.

POSITION WANTED: Textile graduate, age 39, married, 16 years supervisor in dye application laboratory, shade matching cotton, wool, synthetic, stock, yarn, piece goods. Also some plant experience in each. Desires position as dyer or dyer chemist-colorist. Write Box No. 863.

WANTED: JIG DYER FOR 3rd SHIFT. Experienced in rayons, acetates and nylons. Steady work. Salary commensurate with ability. Insurance benefits and paid vacations. Plant located in Southern Massachusetts. Give full details of experience and references. Write Box No. 864.

Try

A

Classified

...that's when this absolutely LEVEL DYEING "pays off"!

An exclusive method of cushioning the shock of flow reversal . . . plus our own pump design to obtain high flow at moderate pressure . . . reduce danger of "blown" beams.

Quality in denim, chambray, gingham and similar fabrics, depends greatly upon *uniform color.* This can be achieved only with *yarn* of uniform color . . . yarn without the slightest variation in shade. The Smith-Drum Beam and Package Dyeing Machine is designed to *insure absolutely level dyeing* of a complete set of beams or packages.

Level dyeing is possible *only* when all beams or packages in the same lot are dyed simultaneously in the *same bath!* This Smith-Drum Machine dyes from 2 to 6 beams or yarn carriers under identical conditions of liquor ratio, flow, pressure and temperature . . . with uniform distribution of additions to the dye bath.

If you are interested in truly uniform dyeing results, economy in operation and saving in floor space, it will pay you to discuss this machine with one of our representatives.

SMITH, DRUM & COMPANY

432 W. Allegheny Avenue, Philadelphia 33, Pa.

Southern Sales Representatives:

PARROTT & BALLENTINE

610 South Carolina National Bank Building

Greenville, South Carolina

Engineered TO YOUR SPECIFICATIONS

**Length 261 ft. of 2 inch stainless steel tubing.
Diameter 9 ft. 3 ins. Vertical height 3 ft.
Weight with fittings and flanges 1000 lbs.
Heat transfer area approximately 162 sq. ft.**

Yes—it was built to specifications, built to do a job. It will continue to do that job day after day for many years without down-time or costly maintenance because it is made from the wonder metal, stainless steel and because it was *engineered and built by SIMS.*

Everyday SIMS build pipe coils into shapes to fit individual installations. Coils made to your specifications and fabricated from *any* commercial metal, such as brass, copper, nickel, monel, inconel, stainless or carbon steel. SIMS Engineers can recommend the right shape, size or material to fit *your* particular job.

Kettles & Vats
Size Boxes
Rolls & Rollers
Dry Cans
Linings
Slasher Cylinders
Vapor Absorption
Air Systems
Dust & Lint Control
Materials Handling
Drying Systems
Machinery Development

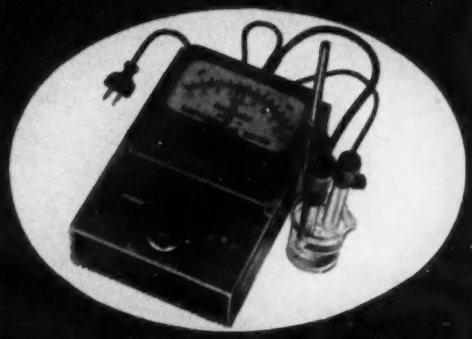
"Custom TAILORS" to INDUSTRY!

SIMS "know-how" and craftmanship is your guarantee of quality products. Close attention is given to the smallest details in material and workmanship to insure that *equipment by SIMS* meets your exacting requirements.

Call, wire or write SIMS today!

Sims METAL WORKS
WEST POINT, GEORGIA

PHOTOVOLT pH Meter MOD. 115



A full-fledged line-operated pH Meter of remarkable accuracy at the unprecedented price of **$115.-**

PHOTOVOLT CORP.
95 MADISON AVE. NEW YORK 16, N. Y.

TINOLAN MARKER

It's New!

TWO FAST COLORS
Ball Point
BLACK $1.25
YELLOW $2.00
each
postage paid

Ball Point for fabrics

Black Markers *only* may be had with felt tip for marking all smooth surfaces.

THE PRACTICAL MARKER FOR TEXTILES
RESISTS MOST DYEING PROCESSES
RIGID—NON-COLLAPSIBLE TUBE—NO SQUEEZING
LEAK-PROOF CONSTRUCTION—LASTS LONGER

ORDER TODAY!
The Tinolan Company of America, Inc.
1016 East Montgomery Avenue Philadelphia 25, Pa.

Call on ARKANSAS CO., *for Thermo-setting Resins*
designed for greatest efficiency for specific needs

RESIPON® A D

—for DIMENSIONAL CONTROL OF RAYONS
—provides residual shrinkage of less than 2%, even after repeated laundering.

—for CRUSH RESISTANCE of cellulosic fabrics
—gives a resilient, crush resistant finish, especially desirable on drapes, dress goods, etc.

—an acetylene · diurea · formaldehyde complex, Resipon A D is stable under long storage. May be applied and cured on conventional equipment.

—as an additive to starches and other film forming finishing agents to it improves durability to laundering.

RESIPON® N C

—for SUPERIOR CRUSH RESISTANCE—imparts soft, resilient hand to cotton and/or rayon fabrics—also useful for wash-resistant embossed and chintz effects.

—provides effective dimensional control at lower concentrations than conventional urea-formaldehyde resins.

—Resipon N C is a modified urea-formaldehyde resin with *low chlorine retention.*
—Excellent storage life.

RESIPON® C

—a urea-formaldehyde resin syrup for finishing rayon, cotton or mixed fiber fabrics for DIMENSIONAL CONTROL, CRUSH RESISTANCE, BODY and a crisp to firm hand.

—Resipon C has found wide application in conjunction with silicone water repellent finishes such as Hydro-Pruf, contributing not only to the hand but also to the durability of the water repellent finish.

Write for Technical Service Bulletins

ARKANSAS CO., INC. · NEWARK · NEW JERSEY

Serving the Textile Industry for over 30 years

AC INC.

The House of Blacks

ACID BLACKS • DIRECT BLACKS
ACETATE BLACKS • LOGWOOD BLACKS
FORMALIDE BLACKS • DEVELOPED BLACKS

Consult your local dyestuff distributors for information and samples. Shipments can be made from their convenient stocks or from our Baltimore or Paterson warehouses.

YOUNG ANILINE WORKS, INC.
OFFICE AND FACTORY
2701-2733 Boston St., Baltimore 24, Md.

HIGHEST QUALITY

SODIUM SULPHIDE FLAKES

Barium's flakes dissolve into a PALE YELLOW, SEDIMENT FREE Solution denoting a minimum of IRON or other HEAVY METALS.

MANUFACTURED BY

BARIUM REDUCTION CORPORATION
South Charleston,
West Virginia

Tempron pipe stops 'em cold!

Ace Tempron synthetic hard rubber pipe handles *hot* corrosives up to 225 deg. F. and higher . . . with better chemical resistance and rigidity than the best nitrile rubber compounds hitherto available. Resists most inorganics and many organics at 200 deg. F. Pipe and fittings 1" to 4". Tempron is only one of *eight* different Ace pipe materials now available. Write today for free Bulletin 96-A.

ACE rubber and plastic processing equipment • SINCE 1852

AMERICAN HARD RUBBER COMPANY, 93 Worth St., New York 13, N. Y.

FOR "TOP DRAWER" SERVICE AND QUALITY...

SPECIFY *HEYDEN!*

SUPERFYDE

(HEYDEN)

A solid polymer of formaldehyde characterised by an extremely low water content, high assay, low reactivity, low solubility, and high melting point. Useful in syntheses requiring formaldehyde, which are prevented or inhibited by traces of water.

CONTAINERS

Superfyde® Powder
Fiber drums, 250, 100, 50, 25 lbs.

PARAFORMALDEHYDE

(HEYDEN)

A solid source of formaldehyde, for manufacturing synthetic resins and as a catalyst for cold-setting adhesives. Also used in fungicides, deodorizers, and photographic chemicals.

CONTAINERS

Paraformaldehyde U.S.P. X
(Powder, Medium Powder, Flo-Granular)
Fiber drums, 250, 50, 25 lbs.

HEXAMETHYLENETETRAMINE

(HEYDEN)

Valuable to the synthetic resins industry in the curing of resins. Used as a chemical intermediate and as a hardening agent for casein, glue and other proteins; as a rubber accelerator; for explosives; for fuel tablets; in medicinals. As an amine, it finds use as a neutralizing or deactivating agent.

CONTAINERS

Hexamethylenetetramine Technical

Granular . . Multiwall paper bags, 75 lbs.; Fiber drums, 100 lbs.
Powder . . . Multiwall paper bags, 50 lbs.; Fiber drums, 100 lbs.

Hexamethylenetetramine U.S.P.

(Methenamine U.S.P. Powder or Granular)
Fiber Drums, 100, 50 and 25 lbs.

FORMALDEHYDE

(HEYDEN)

Widely used in the production of phenolic, urea, melamine and resorcinol resins; for converting casein, glue and other proteins into plastic products. Increasingly important in manufacture of chemicals and fertilizers. Used in embalming fluids, disinfectants, fumigants, deodorants, and in the leather, fur, paper and textile industries.

CONTAINERS

Formaldehyde Solution N.F.

Tank car . . . . . 72,000 lbs.
Tank truck . . . . . 30,000 lbs.
Drums . . . . . 475, 125, 90 lbs.
Carboys . . . . . 100 lbs.

37% Formaldehyde—Methanol Free

Tank cars . . . . 72,000 lbs.
Tank trucks . . . 30,000 lbs.

FINE HEYDEN CHEMICALS

HEYDEN CHEMICAL CORPORATION

342 Madison Avenue, New York 17 N.Y.

CHICAGO · CINCINNATI · DENVER · PHILADELPHIA · PORTLAND · SAN FRANCISCO

VULCANOL

The VULCANOLS REPRESENT a group of durable textile finishes which, when coated on textile fabrics, provide fiber conservation, pile anchorage, non-skid properties, slip resistance and resistance to raveling or fraying.

•

Distributors for Firestone Liberian Latex

•

Our Sales and Technical Staffs Are at Your Disposal

* Registered Trademark

ALCO PRODUCTS

ALCO OIL & CHEMICAL CORPORATION

TRENTON AVE. and WILLIAM ST., PHILADELPHIA 34, PA.

NEW ENGLAND OFFICE
Alco Oil & Chemical Corp.
610 Industrial Trust Bldg.
111 Westminster St.
Providence 3, R. I.
Phone: ELmhurst 1-5449

DEMCO Textile Specialties PRODUCTS

DEMSTA

Starch Viscosity Stabilizer

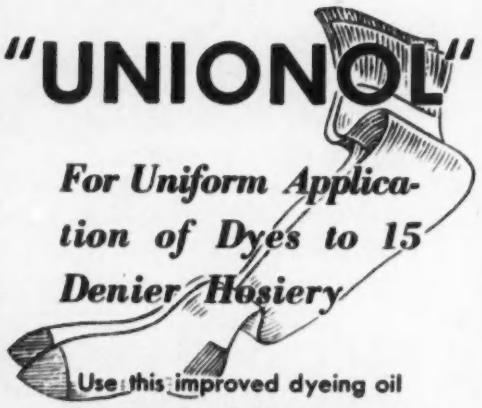
DEMSTA is used in all types of starch and gum mixes to stabilize the viscosity through changes in temperature. **DEMSTA** prevents retrogradation of starch making it possible for overnight or week-end storage. **DEMSTA** contains no enzymes or similar materials which convert or "thin" starch.

Write for samples and Information

DEMCO
Chemical Company
613 W. Ninth St. P.O. Box 553
CHARLOTTE 1, N. C.

"UNIONOL"

For Uniform Application of Dyes to 15 Denier Hosiery



Use this improved dyeing oil to assure level dyeing—good unions—and to guard against costly rejects and redyeing.

LeaTex *"Always Reliable"*

LEATEX CHEMICAL COMPANY
[illegible] N. HANCOCK ST. PHILADELPHIA 33, PA.

PAN

TEXDYE

Water Phase

PRINTING EMULSION COLORS

- **Produce deep shades with the economy of oil phase colors**
- **Reverse-emulsion system provides easy, low cost removal from backgreys and blankets**
- **Completely stable and compatible with anti-crock solutions**
- **Reduce fire hazard to barest minimum**

Texdye colors offer a new brilliance never before obtained with water-phase colors. They provide superior light and wash fastness, negligible dry crocking and vastly superior wet crocking properties.

PAN CHEMICAL also manufactures a complete line of Texdye oil phase colors.

Write

for complete information regarding these other Pan Chemical Specialties

Flock Adhesives
Lacquers
Lacquer Emulsions
Protective Coatings

PAN

CHEMICAL CORPORATION

122 West 22nd St., New York, N.Y.

[illegible] Ave., Hawth[illegible]

HASTINGS LIGHT FAST VIOLET IRS—(C. I. 1073)

and

HASTINGS LIGHT FAST VIOLET 3RL

Excellent Level Dyeing Properties
Very Good Fastness to Light

Recommended for producing fast shades on Ladies' Dress Goods, Carpet Yarn and Upholstery Materials.

ZINSSER & COMPANY, Inc.
ESTABLISHED 1897
Manufacturing Chemists
HASTINGS-ON-HUDSON NEW YORK

59 Years of Research and Manufacturing Experience Assure Superior Quality and Service

Namico

SOAPS and DETERGENTS

SOAPS . . .
low, medium, high titer and built.

DETERGENTS . . .
anionic, nonionic, compounded.

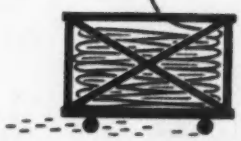
DYE RETARDANTS and PENETRANTS
for every wet processing need.

Technical literature and trained representatives available on request.

NATIONAL MILLING & CHEMICAL CO.
Industrial Soap Products Since 1896
4601 NIXON STREET, PHILADELPHIA 27, PA.

STARSO®

Sodium Silicate
for
modern
bleaching



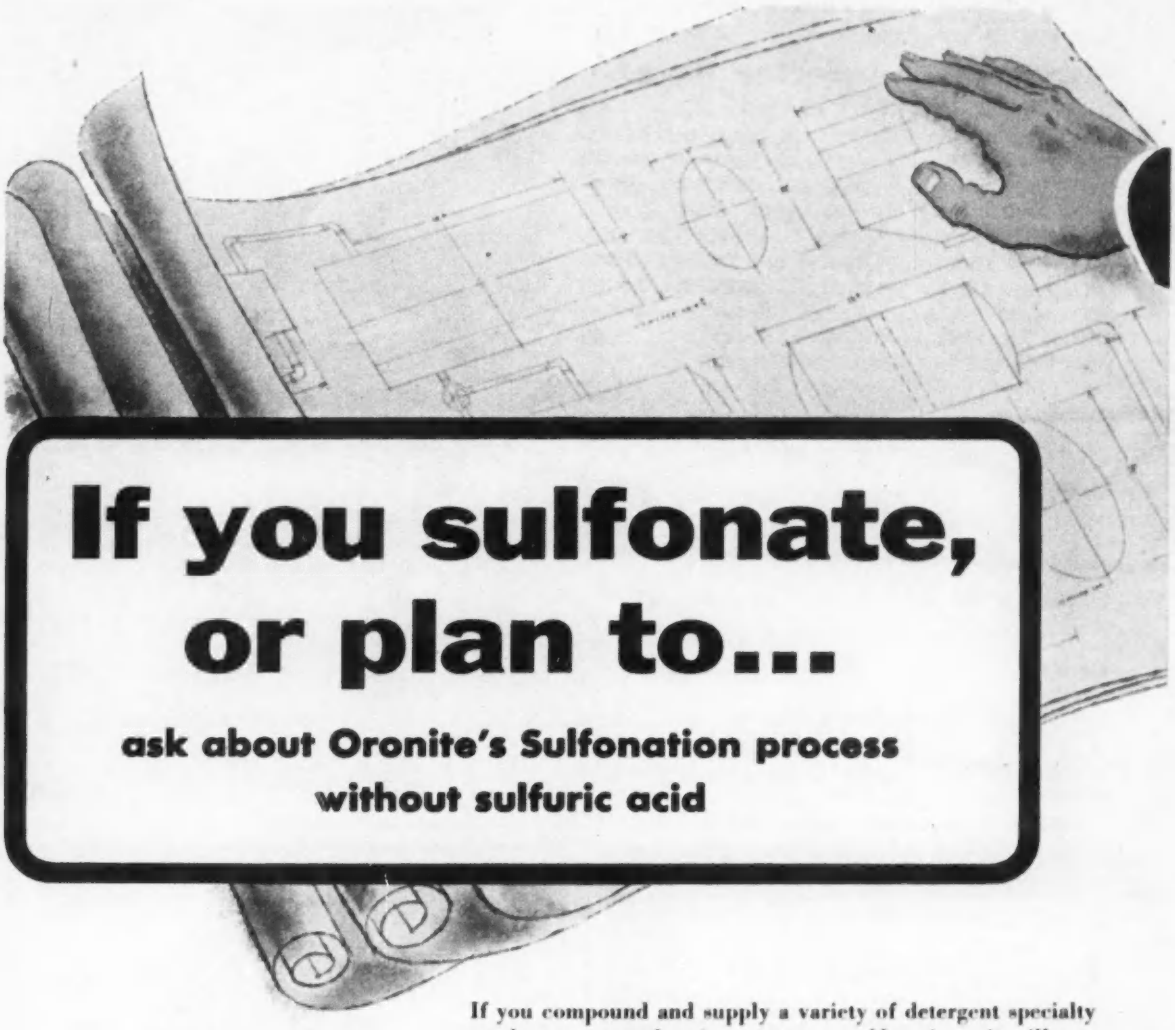
Starso bleaching assistant is as up-to-date as your J-Boxes. It is specially manufactured to remove harmful impurities, permitting even release of oxygen for continuous feeding of goods. You get full bleaching power from every pound of your peroxide.

Bright, clear Starso Silicate has high alkalinity to reduce the need for extra caustic.

PQ® Soluble Silicates
METSO® DETERGENTS

Let us discuss how Starso in your J-Box system can save both time and money.

PHILADELPHIA QUARTZ CO., 1127 Public Ledger Bldg., Phila. 6, Pa.



If you sulfonate, or plan to...

ask about Oronite's Sulfonation process without sulfuric acid

Oronite Surface Active Agents

Detergent Alkane
Detergent Slurry
Detergent D-40
Detergent D-60
Dispersant NI-W
Dispersant NI-O
Wetting Agents

If you compound and supply a variety of detergent specialty products or are planning your own sulfonation—it will pay you to inquire about Oronite's process design which eliminates the acid disposal problem inherent in so many sulfonation systems. Oronite, the world's largest producer of *basic* detergent raw materials, also has plant designs, to fill any processing requirements from one to 10 million or more pounds of finished products annually.

Contact any Oronite office for engineering, manufacturing data and personal assistance on your individual needs. Our experience costs you nothing.

ORONITE CHEMICAL COMPANY

"The world's largest producer of synthetic detergent raw materials"

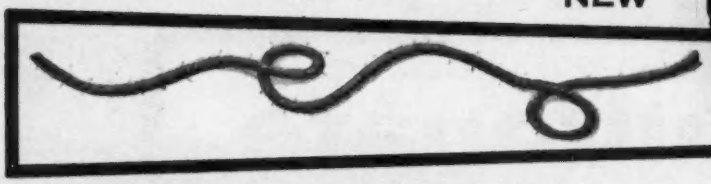
ORONITE CHEMICAL COMPANY

200 Bush Street, San Francisco 20, California
30 Rockefeller Plaza, New York 20, New York
20 North Wacker Drive, Chicago 6, Illinois
714 W. Olympic Blvd., Los Angeles 15, California
Mercantile Securities Building, Dallas 1, Texas

for yarn or fabric—
improved superior finish

Here is new softness, fuller hand for your yarns or fabrics. It is the reason why more and more dyers and finishers specify Lauramine #20. Performance is outstanding with all colors. Lauramine #20 does not yellow whites or affect shades. It is also highly resistant to ageing and scorching. For your convenience, Lauramine #20, modified anionic softener, now comes in two forms — paste or liquid. It is fast dissolving, easy to use, compatible with starches and most finishing compounds. Uniform application and lubrication are assured. Write us for more information and a sample.

NEW



LAURAMINE #20

laurel soap manufacturing co., inc.
2601 EAST TIOGA ST., PHILADELPHIA 34, PA.
WAREHOUSES • Paterson, N. J. Charlotte, N. C. Chattanooga, Tenn.

Laurel Brand

Other quality Laurel Products for better processing:
Coning oils for synthetic yarns — trough emulsions for cotton and woolen yarns — soaps and detergent compounds for scouring and soaping off after dyeing — dyeing assistants — special finishing compounds.

J. E. SIRRINE CO.
GREENVILLE • SOUTH CAROLINA

TEXTILE MILLS • RAYON PLANTS • KNITTING MILLS • FINISHING PLANTS • DYE HOUSES • BLEACHERIES • STEAM UTILIZATION • STEAM POWER PLANTS • WATER • WASTE DISPOSAL • APPRAISALS • PLANS • REPORTS

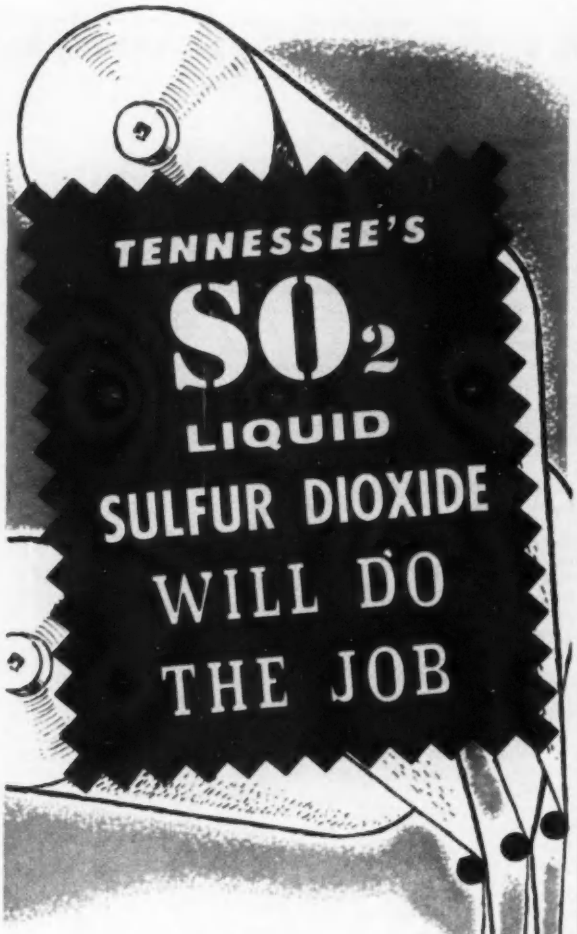
Atlantic City's
Newest Convention Hotel

The Jefferson with its new facilities for handling all convention groups is fast becoming Atlantic City's most popular convention hotel.

The Jefferson features an abundance of Meeting, Banquet and Exhibition Rooms fully equipped to handle your every need. Experienced personnel. Location ideal in heart of Atlantic City.

WRITE • PHONE • WIRE TODAY
FOR DESCRIPTIVE LITERATURE

Convention Manager,
HOTEL JEFFERSON
Atlantic City, N. J.



An efficient reducing, bleaching, antichlor or neutralizing agent of highest quality—practically 100 per cent pure—It's easy to transport, store and handle—In your textile processing, you will do better with Tennessee's highest quality Liquid Sulfur Dioxide.

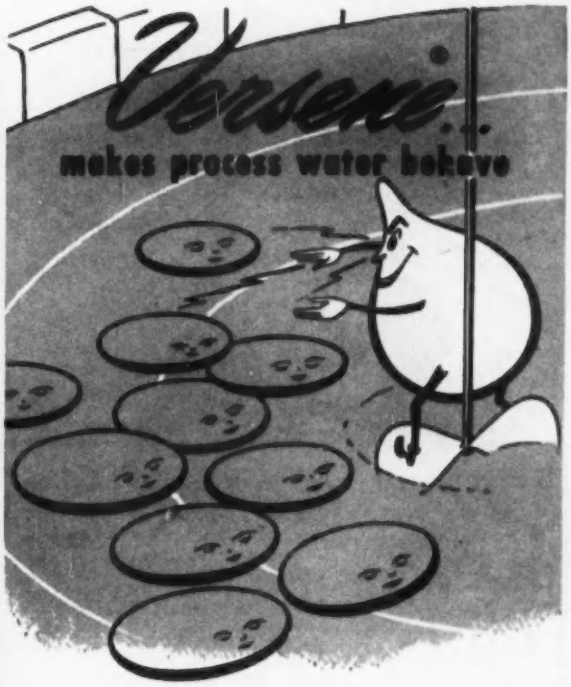
SO_2, the chemical with so many uses, can no doubt do a job for you more economically and efficiently—We would like the opportunity of discussing this with you.

CONTAINERS: Cylinders, Ton Drums, Tank Trucks and Tank Cars.

SULFUR-DIOXIDE HIGHEST QUALITY SO_2

TENNESSEE TC CORPORATION

617-629 Grant Building, Atlanta, Georgia



WATER · THE *IMPORTANT* CHEMICAL

Few textile plants have access to water so soft that it doesn't interfere with washing, scouring, bleaching, dyeing, finishing or other wet processing operations. This is why all raw process water must be regarded as an *active chemical* until proven otherwise. Versene makes the active ingredients in process water behave and become inert. It completely and permanently softens water without forming precipitates by inactivating any calcium, magnesium, iron, copper, lead or other metal contaminants which may be present.

VERSENE · ECONOMY WITH EFFICIENCY

Textile manufacturers and processors now using the Versenes find them highly profitable in one or more wet operations. Let us show you how they can save *you* money.

VERSENE · A COMPLETE LINE

A complete line of basic Versene products and compounds permits chelation throughout the entire pH range. Practically any metallic contaminant may be "eliminated" with the *right* Versene. All Versene products are exceptionally stable at high temperatures throughout the pH range. Quality is unduplicated and uniformity of chelating power is guaranteed. Samples on request. Ask for Technical Bulletin No. 2. Chemical Counsel when needed.

"Chemistry's most precise chemicals"

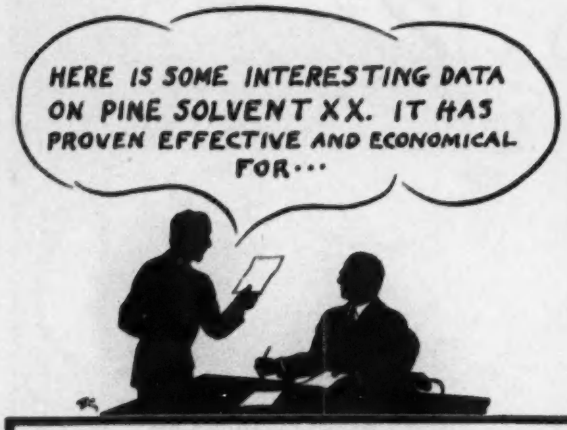
VERSENES INCORPORATED

subsidiary of THE DOW CHEMICAL COMPANY

FRAMINGHAM, MASS.

WAREHOUSE STOCKS

Chas. S. Tanner Co., 2300 No. Brevard St., Charlotte, N. Carolina
Kraft Chemical Co., Inc., 917 West 18th St., Chicago 8, Ill.
Independent Chemical Corp., One Hanson Place, Brooklyn 17, N. Y.
Borada & Page, Inc., Houston, Dallas, Corpus Christi, New Orleans, St. Louis, Wichita, Oklahoma City, Tulsa, Kansas City, Mo.
George Mann & Co., Inc., 251 Fox Point Blvd., Providence, R. I.
Braun-Knecht-Heimann Co., San Francisco, Calif.
Braun-Knecht-Heimann Co., Salt Lake City, Utah
Van Waters & Rogers, Inc., Seattle, Wash. & Portland, Ore.
Braun Corporation, Los Angeles, California
European Manufacturing Agent:
Bexolinfabriken Aktiebolag, Helsingborg, Sweden



COTTON: In the kier, Pine Solvent XX brings the liquor in contact with every fiber, leaves uniform bottoms that dye and finish more evenly. Boiling time is cut. Fibers are softer, fuller, more resistant to age-discoloration.

WOOL: Pine Solvent XX is valuable in raw-wool scouring . . . irreplaceable in fulling. From the raw stock it produces clean, soft, really white wool in prime condition for storage or further processing. In the fulling mill, it cuts time as much as 30% . . . costs no more . . . helps you meet contract delivery dates on time.

RAYON: In boiling off, Pine Solvent XX rapidly emulsifies gelatinous materials . . . is safe for the most delicate fabrics. Used in dyeing, it makes the fabrics wet out and sink quickly.

DYEING: Pine Solvent XX makes dye liquor penetrate the hardest fibers and heaviest seams. It gives an even, level deposit of dyestuff of uniform depth throughout every fiber. Loose dyestuff and impurities are suspended for washing out completely.

PRINTING: In printing paste, Pine Solvent XX wets pigments thoroughly, disperses them evenly, and holds them in suspension without agglomeration until the design is on the fabric. Designs are sharp, colors bright and clear, no specks are formed.

CUT TIME AND COST—IMPROVE RESULTS IN ALL WET PROCESSING WITH BURK-SCHIER PINE SOLVENT XX

Burk-Schier Pine Solvent XX Reduces Surface and Interfacial Tensions . . . Wets, Penetrates, Suspends, Disperses . . . Aids Detergents and Dyes. A Little Does a Lot and Does It Well.

SCOURING WETTING PINE-SOLVENT BLEACHING DYEING

BURKART-SCHIER CHEMICAL CO.

CHATTANOOGA, TENNESSEE

PENETRANTS • SOFTENERS • SOLUBLE OILS FINISHES

● INDEX TO ADVERTISERS ●

Alco Oil & Chemical Corp.	54A
Alliance Color & Chemical Corp.	
Althouse Chemical Co., Inc.	47A
Amalgamated Chemical Corp.	
American Aniline Products, Inc.	3A
American Cyanamid Co. (Dyestuff Dept.)	
American Cyanamid Co. (Tex. Resin Dept.)	Back Cover
American Dyestuff Reporter	41A
American Hard Rubber Co.	52A
Anders Chemical Co.	
Antara Chemical Division of General Dyestuff Co.	21A
Apex Chemical Co., Inc.	
Arkansas Company, The	51A
Armour & Co.	4A, 18A
Arnold Hoffman & Co., Inc.	23A
Atlantic Refining Co., The	31A
Atlas Electric Devices Co.	10A
Aula Chemicals, Inc.	29A
Augusta Chemicals, Inc.	
Barium Reduction Corp.	52A
Becco Chemical Div., Food Machinery & Chemical Corp.	39A
Berkshire Color and Chemical Co.	11A
Bick & Co., Inc.	
Bryant Chemical Corp.	63A
Burkart Schier Chemical Co., Inc.	60A
Burlington Engineering Co., Inc.	
Butterworth & Sons Co., H. W.	64A
Calgon, Inc.	
Campbell & Co., Inc., John	38A
Carbic-Moss Corp.	42A
Carbide & Carbon Chemicals Co., A Division of Union Carbide and Carbon Corp.	
Charlotte Chemical Laboratories, Inc.	
Ciba Company, Inc.	
Colgate-Palmolive Company	
Columbia-Southern Chemical Corp.	7A
Cravenette Co., The	
Custom Scientific Instruments	
Demco Chemical Co.	54A
Dexter Chemical Corp.	46A
Drew & Co., Inc., E. F.	
Du Pont de Nemours & Co., (Inc.), E. I.	
Dyes and Chemical Divisions	Front Cover
Electrochemicals Dept.	14A
Organic Chemicals Auxiliaries	20A
Eastman Chemicals Products Inc.	
Emery Industries, Inc.	
Emkay Chemicals Co.	
Fancourt & Co., W. F.	Third Cover
Feeley Co., E. I.	62A
Foxboro Co., The	
Gaston County Dyeing Machine Co.	
Geigy Company, Inc.	
General Dyestuff Co.	
General Electric Co.	
Goodrich Chemical Company, B. F.	28A
Goodyear Tire & Rubber Co.	
Gurley, W. & L. E.	
Herchem Div., Wallace & Tiernan, Inc.	
Hart Products Corp., The	36A
Hermas Machine Co.	
Heyden Chemical Corp.	53A
Hilton-Davis Chemical Co., The	
Houghton & Co., E. F.	
Hubinger & Co., The	40A
Imperial Paper & Color Corp.	
Interchemical Corp., Textile Colors Div.	26A, 27A
International Salt Co., Inc.	22A
Jefferson Hotel	58A
Jersey State Chemical Co.	17A

CUSTOMERS ARE LOOKING UNDER THE HOOD!

YES, customers want to *know!* They no longer believe only what their eyes may tell or their sense of touch may reveal. They want the *whole* story. They want to "look under the hood!" Factors that aren't always visible are often the most valuable. It's the hidden values that spark the customer interest — values like washability, freedom from shrinkage and change in texture, life-of-the-fabric fit and comfort—all of the wonderful wool-saving features that SCHOLLERIZING assures!

Tell the Whole Story on the Hang-Tag...

Wool that is SCHOLLERIZED is the best point-of-sale selling force you can have!

*Schollerized**
WASHABLE WOOL
SAFE TO TUB • SAFE TO RUB

*U.S. and Foreign Patents Pending

. . . Puts the "*sell*" in wool

● Schollerizing Prevents Shrinkage in Wool by Eliminating Matting and Felting . . . a process that is safe, uniform and requires no extraordinary skills.

Scholler BROTHERS, INC.

WRITE FOR ALL THE DETAILS OF SCHOLLERIZING AS APPLIED TO YOUR WOOL PRODUCT!

Manufacturers of Scouring, Dyeing and Finishing Materials; Soaps, Softeners and Sulphonated Oils
COLLINS at WESTMORELAND, PHILADELPHIA 34, PA.
IN CANADA: SCHOLLER BROTHERS, LTD., ST. CATHARINES, ONTARIO

SCHOLLERIZE — THE SAFE Wool Shrinkage Control Process

E. J. FEELEY CO.

DYESTUFFS
MANUFACTURER OF
TEXTILE CHEMICALS

263 SUMMER ST. BOSTON, MASS.
1700 WALNUT ST. PHILADELPHIA, PA.
650 STATE ST. CHARLOTTE, N. C.

AND

DISTRIBUTORS IN THE SOUTH

OF

BASES
STABLE SALTS

PYRAZOLINES (FAST DIRECT DYES)
DIPYRAZOS (DEVELOPED DYES)

COLORS FOR WOOL

MANUFACTURED
BY

PHARMA CHEMICAL
CORPORATION

● INDEX TO ADVERTISERS ●

Kali Mfg. Co.	
Kelco Co.	
Klauder Weldon Giles Machine Co.	
Laurel Soap Mfg. Co., Inc.	58A
Le Conte & Co., Inc.	
Leztex Chemical Co.	54A
Mathieson Chemicals, Olin Mathieson Chemicals Corp.	
May, Inc., Otto B.	25A
Metalsmith Div., Orange Roller Bearing Co., Inc.	
Metro-Atlantic Co., Inc.	37A
Monsanto Chemical Co.	
Morningstar Nicol, Inc.	
Morton Salt Co.	
Mutual Chemical Co. of America	
National Aniline Division, Allied Chemical & Dye Corp.	5A
National Milling & Chemical Co.	56A
National Starch Products	
Naugatuck Chemical Div. of U. S. Rubber Co.	33A
Nopco Chemical Corp.	15A
Nova Chemical Corp.	
Nyanza Color & Chemical Co., Inc.	
Olin Mathieson Chemicals Corp. Industrial Chemicals Div.	
Onyx Oil & Chemical Co.	8A, 9A
Oronite Chemical Co.	57A
Pabst Sales Co.	
Pad Dye Corp.	
Pan Chemical Co.	55A
Perkins & Sons, Inc., B. F.	
Pfister Chemical Works, Inc.	44A
Pharma Chemical Corp.	42A
Philadelphia Quartz Co.	56A
Photovolt Corp.	
Pittsburgh Coke & Chemical Co.	
Procter & Gamble	
Reading Scientific Co.	
Refined Products Co.	Second Cover
Rohm & Haas Co.	45A
Royce Chemical Co.	
Rumford Chemical Works	
Sandoz Chemical Works, Inc.	
Scholler Bros., Inc.	61A
Seydel-Wooley & Co.	48A
Sherwin-Williams Co.	
Sims Metal Works	
Sirrine Co., J. E.	58A
Smith, Drum & Company	49A
Solvay Process Division, Allied Chemical & Dye Corp.	16A
Standard Brands, Inc.	19A
Standard Chemical Products, Inc.	30A
Stein Hall	
Swift & Company	13A
Taylor Instrument Companies	35A
Tennessee Corporation	59A
Tex-Chem Co.	
Union Carbide & Carbon Corp., Carbide & Carbon Chemicals Co.	
U. S. Rubber Co., Naugatuck Div.	33A
Van Vlaanderen Machine Co.	
Verona Dyestuffs	
Versenes, Inc.	59A
Victor Chemicals	
Virginia Smelting Co.	
Wallerstein Co., Inc.	12A
Warwick Chemical Co.	
Westvaco Chem. Div., Food Machinery & Chemical Corp.	
Wica Chemicals, Inc.	34A
Wiesner-Rapp Co., Inc., The	
Wolf & Co., Jacques	
Wyandotte Chemicals Corp.	32A
Young Aniline Works, Inc.	52A
Zinsser & Co., Inc.	56A

RESIN DJ Plunges FIRMEL Skates

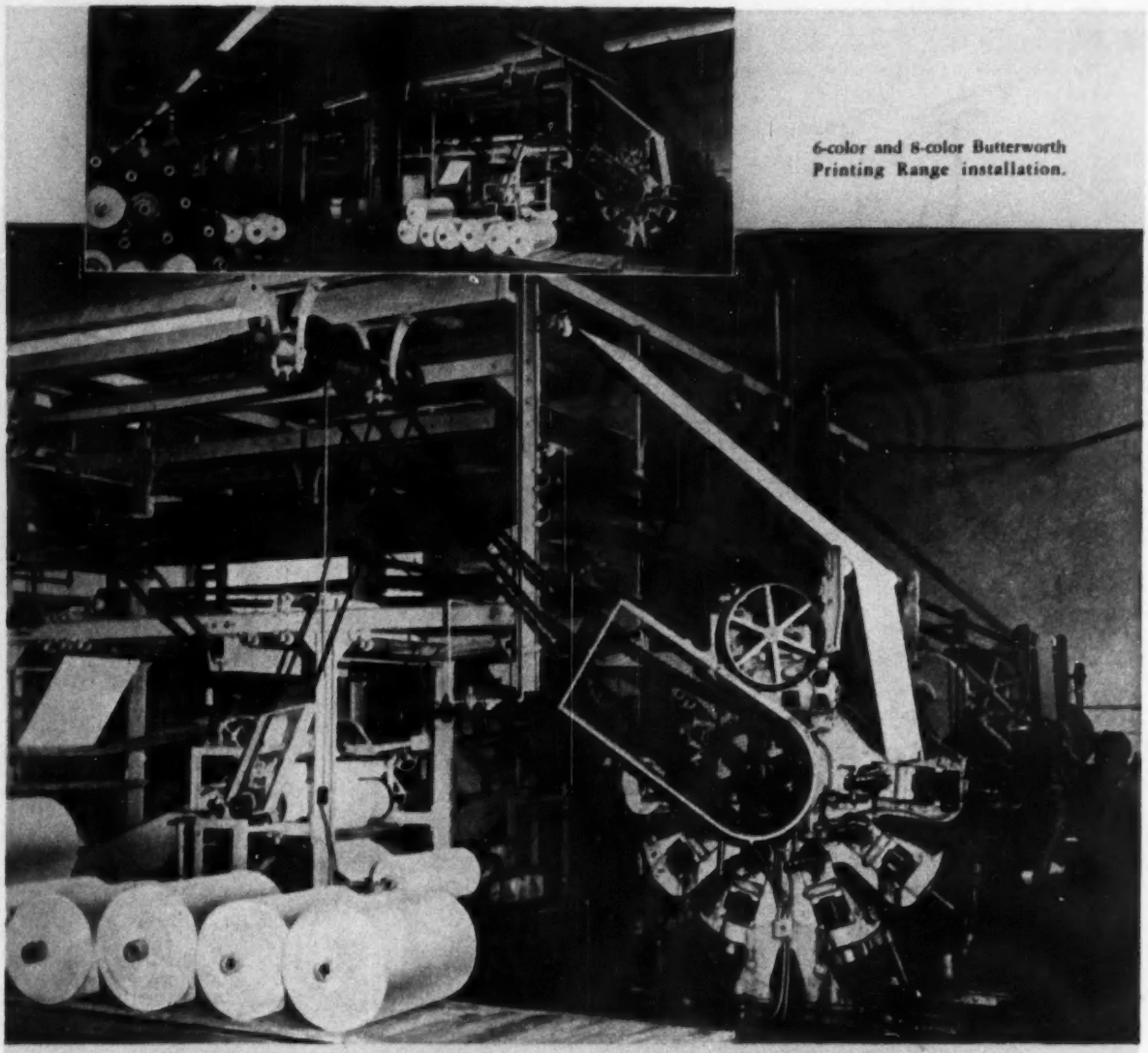
IN THE FINISHING OF SCHREINERED, EMBOSSED OR FRICTIONED FABRICS

RESIN DJ plunges in to retain a good hand without excessive use of softeners. It is designed for permanent glaze, stabilized and crush resistance finishes. **FIRMEL** skates on the surface producing the maximum in lustre, glaze, and crisp hand. It produces the ultimate in resin fixation and permanency. **COMBINING** their penetrating and surface finishing qualities, produces the finish and result required with a minimum of tensile loss and handling problems. Send for samples.

Brytex

BRYANT CHEMICAL CORPORATION

N. QUINCY 71, MASS. Box 2301, SPARTANBURG, S. C.



6-color and 8-color Butterworth Printing Range installation.

Accurate Register . . . with precision-built Butterworth Printing Machines

Butterworth Printing Machines are designed and precision-built to permit close control of printing on cotton, silk, or synthetic fabrics. Up to 14 color shades in multiple patterns and small figure designs are registered accurately by means of precision-machined nips.

To assure smooth, high-speed operation, Butterworth Printing Machines are equipped with roller bearings . . . printing cylinder is heavy, balanced and rubber-covered . . . side frames are ruggedly constructed for long-term heavy duty. For full details, call or write —

H. W. BUTTERWORTH & SONS CO.
Bethayres, Pennsylvania
1211 Johnston Building, Charlotte, N. C.
187 Westminster Street, Providence, R. I.
Representatives in Principal Cities of the World

Machines for Bleaching, Boiling-Out, Dyeing, Mercerizing, Finishing & Embossing
Pot Spinning Machines for Synthetic Fibers
Calender Rolls : : Tenter Chains

BUTTERWORTH

Now... *One Bath*
SCOURING AND DYEING:

with FANCO SCOURLON
FANCO PENTALON

Now you can get clean, even, level dyeing with good unions — in one simple operation — with Fancourt's Scourlon and Pentalon.

Scourlon is a speedy, effective detergent for removing soil, waxes and oils from nylon. Pentalon assists dyestuffs to disperse, penetrate and level.

The Scourlon-Pentalon combination gives you higher quality, easier-to-sell hosiery . . . saves processing time . . . lowers material cost.

For complete information on Fancourt's new Scourlon-Pentalon one-bath technique, call or write Fancourt today.

VISIT FANCOURT BOOTH
NOS. 516 AND 517 AT THE
TEXTILE SHOW — ATLANTIC CITY
APRIL 25 TO APRIL 29

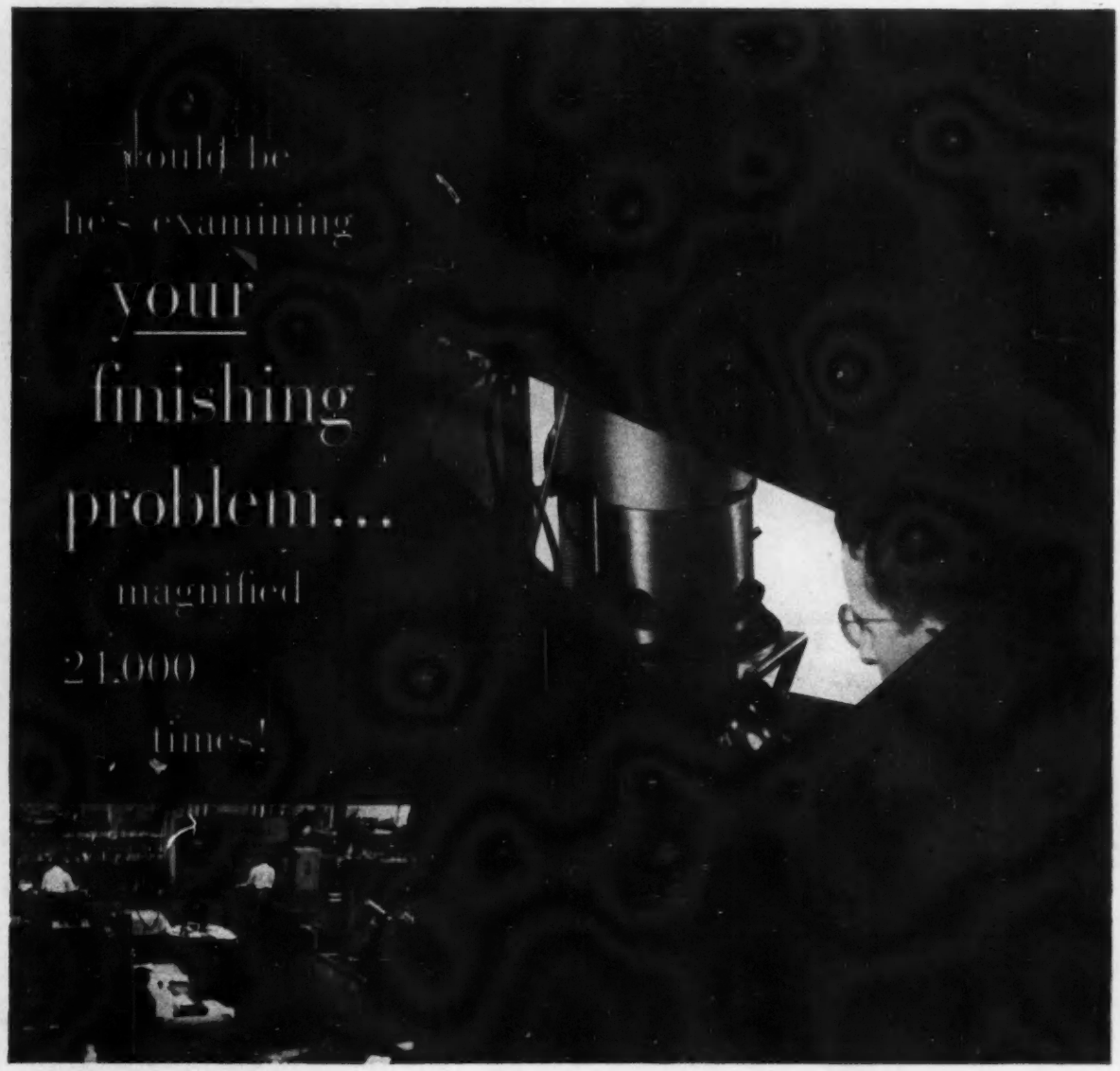
SCOURLON is an alkaline buffered powdered detergent with safe, high-capacity powers to remove soil, waxes and oils from nylon.

PENTALON is a clear amber liquid possessing high dispersing, penetrating, and leveling action with dyestuffs.

W. F. FANCOURT CO.
518 SOUTH DELAWARE AVE.
PHILADELPHIA 47, PA.

SOLVING FINISHING PROBLEMS SINCE 1904

SOUTHERN OFFICE—846 S. MAIN ST., BURLINGTON, N. C.
CANADIAN OFFICE—CHEMTEX PRODUCTS, LTD.
168 SEATON ST., TORONTO, ONTARIO



Sometimes before we can find the right answer to a customer's finishing problem we have to see its components 24,000 times bigger than life . . . through one of the most precise diagnostic instruments in all science, the electron-microscope. This powerful and costly instrument, rare in industry, is typical of the vast and advanced technical facilities used by American Cyanamid scientists to help our customers achieve a desired textile finish. In addition to basic Cyana finishes like PERMEL® PLUS, SUPERSET®, AEROTEX®, CYANA® SHRINKAGE CONTROL, and other famous textile chemicals, our research and development laboratories produced over 10,000 *individual* finishes during the past five years alone. This accumulated experience is at your service. Working together, we may help you find just the right finish to help sell your merchandise and keep it sold. Call your Cyanamid representative today.

YOU DO BETTER WITH

AMERICAN Cyanamid COMPANY

TEXTILE RESIN DEPARTMENT

BOUND BROOK
NEW JERSEY

30 ROCKEFELLER PLAZA
NEW YORK 20, N. Y.

BOSTON · PHILADELPHIA · CHICAGO · LOS ANGELES · CHARLOTTE · PROVIDENCE

North American Cyanamid Ltd., Montreal

PRODUCERS OF THE WORLD'S FINEST TEXTILE RESINS